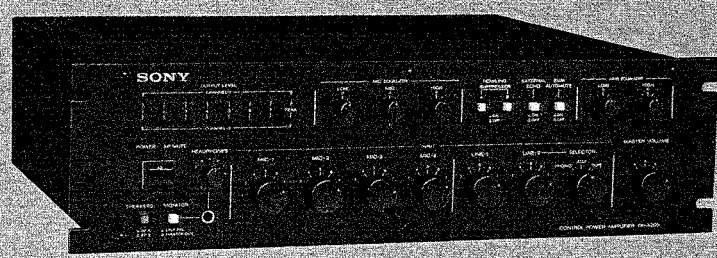
PA-A200

CONTROL POWER AMPLIFIER



SPECIFICATIONS

Power amplifier section

Maximum power output
60 W+60 W (8 ohms)
80 W+80 W (4 ohms)
55W + 55W (8 ohms) (AE only)
70W + 70W (4 ohms) (AE only)
(Harmonic distortion at 1 kHz less than 1 %, tone burst 8 ms ON, 24 ms OFF)

Reference output 1.2 W+1.2 W (8 ohms)
2.4 W+2.4 W (4 ohms)
(20 – 20,000 Hz, Harmonic distortion 0.3 %)

Number of channels
2

Reference input level
−15 dBs* at 1 kHz

Maximum input level
0 dBs at 1 kHz

Input impedance 30 kilohms (20 – 20,000 Hz)

Residual noise Less than 23 μV (8 ohms, weighting network A)

S/N More than 90 dB at reference output (8 ohms, 20 – 20,000 Hz)
More than 102 dB at reference output (8 ohms, weighting network A)

Headroom and Dynamic range

Load impedance	Headroom	Dynamic range
8 ohms	17 dB	119 dB
4 ohms	15 dB	117 dB

Gain 27 dB

Headphones output
15 mW at reference input (32 ohms)

*0 dBs = 0.775 V

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Mixer section

Inputs

INPUTS	Number of input channel	Reference level	Maximum level	Input impedance (1 kHz)	Type of connector
MIC	4 (monaural)	−60 dBs	−33 dBs	4 kilohms balanced	cannon XLR-3-31 (equivalent)
LINE-1	1 (stereo)	−10 dBs	10 dBs	more than 50 kilohms unbalanced	phono jack
PHONO	1 (stereo)	2.5 mV	100 mV	50 kilohms unbalanced	phono jack
AUX	1 (stereo)	−10 dBs	10 dBs	more than 50 kilohms unbalanced	phono jack
TAPE	1 (stereo)	−10 dBs	10 dBs	more than 50 kilohms unbalanced	phono jack
ECHO RETURN	1 (stereo)	−10 dBs	10 dBs	more than 30 kilohms unbalanced	phono jack

Outputs

OUTPUTS	Number of output channel	Reference level	Maximum level	Output impedance (1 kHz)	Type of connector
MASTER OUT	1 (stereo)	−15 dBs (load impedance more than 10 kilohms)	18 dBs (load impedance more than 10 kilohms)	150 ohms unbalanced	phono jack
REC OUT	1 (stereo)	−5 dBs	18 dBs	10 kilohms unbalanced	phono jack
ECHO SEND	1 (stereo)	−5 dBs	22 dBs	150 ohms unbalanced	phono jack

Microphone equalizer
HIGH: ±10 dB at 4.5 kHz, peaking
MID: ±10 dB at 1.5 kHz, peaking
LOW: ±12 dB at 200 Hz, peaking

Line equalizer
HIGH: ±12 dB at 20 kHz, shelving
LOW: ±14 dB at 20 Hz, shelving

Frequency response
LINE: 20 Hz–20 kHz ±0.5 dB
MIC: 50 Hz–10 kHz $^{+1}_{-4.5}$ dB

Harmonic distortion
Less than 0.3 % (−15 dBs, 20–20,000 Hz)

Maximum gain 65 dB (load impedance 50 kilohms)

General

Power requirements
For USA and Canada: 120 V ac, 60 Hz
For Europe and the United Kingdom: 110, 127, 220, 240 V adjustable, 50/60Hz

Power consumption
150 watts (USA and Canadian models)
180 watts (other models)
43 watts at idling
350 watts (4 ohms, 80 watts, both channels driven)

Dimensions 483 × 132.5 × 350 mm (w/h/d) (19 × 5¼ × 13⅞ inches) including projecting parts and controls

Weight Approx. 13.1 kg (28 lb 14 oz)

Accessories supplied
Microphone cable ECP-5-3PHS (2)
Power cord (1)
Speaker cable RK-10-4P (1)

While the information given is true at the time of printing, small production changes in the course of our company's policy of improvement through research and design might not necessarily be indicated in the specifications.
We would ask you to check with your appointed Sony dealer if clarification on any point is required.

AUDIO POWER SPECIFICATIONS

POWER OUTPUT AND TOTAL HARMONIC DISTORTION:
With 8-ohm loads, both channels driven, from 20–20,000 Hz; rated 40 watts per channel minimum RMS power, with no more than 0.15% total harmonic distortion from 250 milliwatts to rated output.
With 4-ohm loads, both channels driven, from 20–20,000 Hz; rated 40 watts per channel minimum RMS power, with no more than 0.15% total harmonic distortion from 250 milliwatts to rated output.

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SECTION 1
GENERAL DESCRIPTION

1-1. FEATURES

Multiple inputs
Equipped with four MIC inputs (MIC-1 to MIC-4, monaural) and two LINE inputs (LINE-1 and LINE-2, stereo). The three kinds of input connectors are provided for the LINE -2 inputs: PHONO, TAPE and AUX.
The built-in mixing function allows you to mix all the input signals.

Two kinds of howling suppression circuits
One is to detect the distance between the speaker and the microphone and to reduce the volume of the speaker near the microphone, and the other is to reduce the output level of the amplifier when there is no input to the microphone.

Automatic muting function of the background music
BGM AUTOMUTE circuit attenuates the output level of the signal from the LINE-1/LINE-2 connectors when a microphone picks up the input.

Pre-fader listening
The source sound from the LINE inputs can be monitored with headphones while distributing the microphone sound through the speakers. This allows you, for example, to prepare the next sound source for BGM while a person is speaking into the microphone.

Two independent equalizer circuits
One for MIC inputs and the other for LINE inputs. If you adjust each equalizer to the appropriate level previously, there is no need to adjust the equalizer while broadcasting the sound.

Capable of connection of a reverberator
This amplifier is equipped with connectors for a reverberator: ECHO SEND and ECHO return, so that you can add a reverberation effect to the microphone sound.

Parallel drive of two power amplifiers
By connecting two PA-A200's to each other, you can control the power amplifier section of two units in parallel. With this system, you can drive up to 8 pairs of speakers at a time. You can also use the two PA-A200's independently without disconnecting them.

1-2. PRECAUTIONS

On safety
- Check that the operating voltage of your unit is identical with the voltage of your local power supply.
- Should any liquid or solid object fall into the cabinet, unplug the unit and have it checked by qualified personnel before operating it any further.
- Unplug the unit from the wall outlet if it is not to be used for an extended period of time. To disconnect the cord, pull it out by grasping the plug. Never pull the cord itself.

On installation
- Do not install the unit in a location near heat sources such as radiators or air ducts, or in a place subject to direct sunlight, excessive dust, mechanical vibration or shock.
- Good air circulation is essential to prevent internal heat built-up in the unit. Place the unit in a location with adequate air circulation. Do not place the unit on a soft surface, such as a rug that would block the ventilation holes on the bottom.
- Do not place anything on top of the cabinet. The top ventilation holes must be unobstructed for the proper operation of the unit and to prolong the life of its components.

On operation
- Before making program source connections, be sure to turn the power switch off and unplug the unit.
- Do not attempt to test the protection circuits by blocking the ventilation holes or connecting improper loads.
- When the unit is not used, turn the power off to conserve energy and to extend the useful life of your unit.

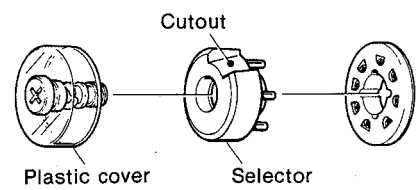
On cleaning the cabinet
Clean the cabinet, panel and controls with a soft cloth lightly moistened with mild detergent solution. Do not use any type of abrasive pad, scouring powder or solvent such as alcohol or benzine.

On repacking
Do not throw away the carton and the packing material. It makes an ideal container to transport the unit in. When shipping the unit for repair work or to another location, repack it as illustrated on the carton box.

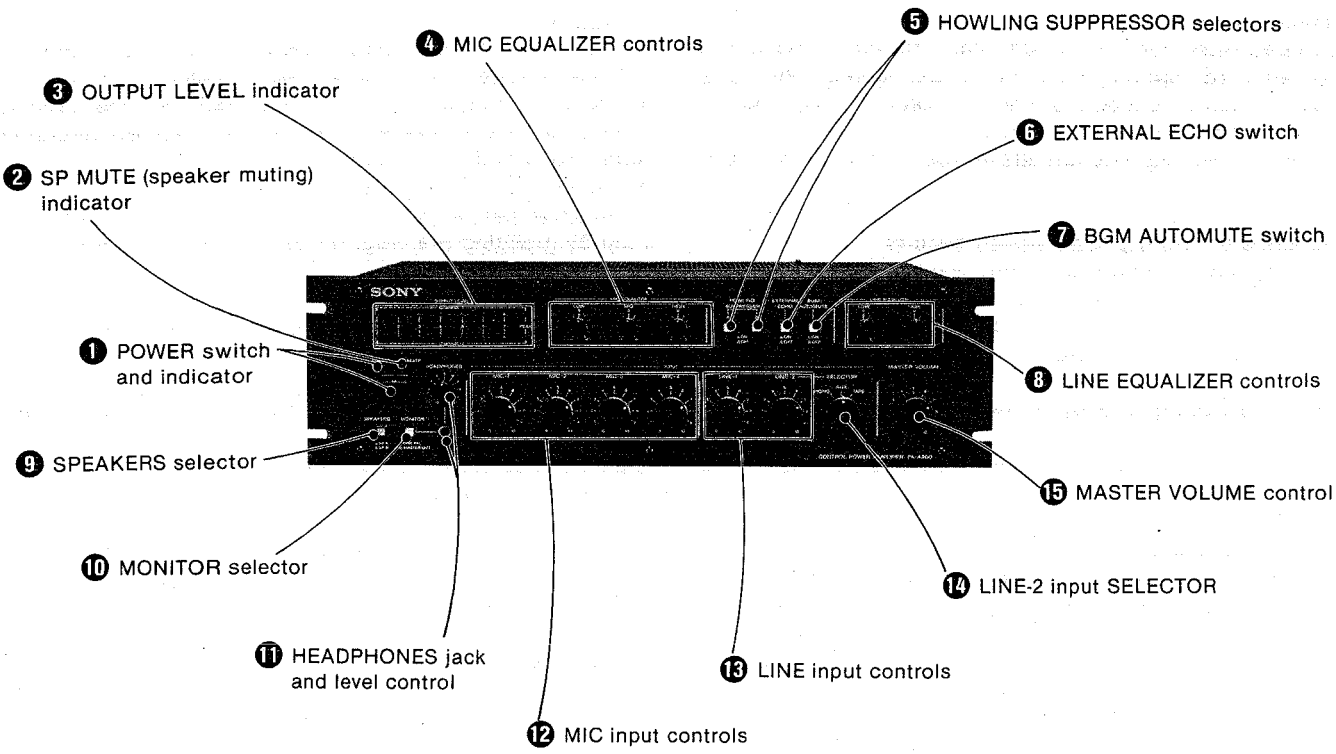
1-3. VOLTAGE ADAPTATION TO YOUR POWER SUPPLY

The model available in U. S. A. and Canada operates only on 120 V ac.
The model available in other countries operates on either 110, 127, 220, or 240 V ac and is equipped with a voltage selector. Before connecting the unit to a wall outlet, check that the operating voltage of the unit is identical with the voltage of your power supply. If necessary, reset the VOLTAGE SELECTOR on the rear panel as follows.

1 Remove the plastic cover using a Philips screwdriver (+).
2 Remove the selector and reinsert it so that the correct voltage figure can be seen at the cutout.
3 Reset and fasten the plastic cover.



1-4. LOCATION AND FUNCTION OF CONTROLS


❹ MIC EQUALIZER controls
❺ HOWLING SUPPRESSOR selectors
❸ OUTPUT LEVEL indicator
❻ EXTERNAL ECHO switch
❷ SP MUTE (speaker muting) indicator
❼ BGM AUTOMUTE switch
SONY
❶ POWER switch and indicator
❽ LINE EQUALIZER controls
❾ SPEAKERS selector
⓯ MASTER VOLUME control
❿ MONITOR selector
⓮ LINE-2 input SELECTOR
⓫ HEADPHONES jack and level control
⓭ LINE input controls
⓬ MIC input controls

❶ POWER switch and indicator

Depress the upper part of the switch to turn on the power. The POWER indicator lights up in green.
The SP MUTE indicator will light up in red when the power is turned on, because the speaker output is cut off until the operation of the amplifier is stabilized. It will go off in a few seconds, indicating that the unit is now standing by.
To turn off the power, depress the lower part of the switch.

❷ SP MUTE indicator

This indicator lights up when the built-in protection circuit cuts the output of the amplifier off in one of the following cases:

- when the power switch is turned to ON.
- when the amplifier overheats.
- when dc voltage appears at the output of this amplifier.

❸ OUTPUT LEVEL indicator

This indicator shows the output level of the amplifier. At position "4", nominal power output will be obtained. With this setting, the output will be approximately 15 dB lower than the level at which clipping distortion may occur.
The red "PEAK" position shows that the amplifier is operating with its maximum power. If the indicator continuously lights up to the "PEAK" position, lower the master volume, otherwise distortion may occur. The maximum power output depends upon the load impedance, as follows.

Load impedance	Number of speaker systems per channel	Maximum power output per channel
16 ohms	1	20 watts
8 ohms	2	40 watts
5.3 ohms	3	60 watts
4 ohms	4	80 watts

❹ MIC EQUALIZER controls

Adjust the tone of the microphone inputs. Center frequency of the LOW control is 200 Hz, that of the MID control is 1.5 kHz, and the HIGH control 4.5 kHz.
Clockwise rotation increases the level.

❺ HOWLING SUPPRESSOR selectors

If the microphone is placed too near the speakers, a howling effect caused by acoustic feedback may occur. This amplifier has two built-in howling suppressor systems: A and B.

Howling suppressor A: Available only when you use both the supplied microphone cable and the SS-P200 speaker system (optional). Depress the A selector when the microphone may go near the speakers. The howling suppression circuit will operate when triggered by the distance detection circuit and attenuate the output level of the speaker system by approximately 10 dB. To deactivate the suppressor circuit A, press the selector again.

HOWLING SUPPRESSOR B: Depress the B selector when you use the suppressor B circuit. While no inputs are supplied to the microphone, the output level of the microphone amplifier is attenuated by approximately 4 dB. When an input signal appears, the output level previously set will be restored.

To deactivate the suppressor B circuit, press the selector again.

❻ EXTERNAL ECHO switch

Depress this switch to add a reverberation effect to the microphone input when a reverberator is connected to the ECHO SEND and RETURN connectors on the rear. The reverberation effect is added to the input which is selected by the ECHO SEND switch on the rear.

- If the EXTERNAL ECHO switch is set to ON when a reverberator is not connected, the output level will be increased by approximately 1 dB.

❼ BGM AUTOMUTE switch

Depress this switch to activate the BGM automatic muting function. This function automatically reduces the volume of the background music when a person begins to speak into the microphone. A few seconds after the speaking ends, the volume will be restored to the previous level.

Use this function when you connect a music source to the LINE-1 or LINE-2 connector and keep the music playing throughout a conference or a party.

To deactivate the function, press the switch again.

❽ LINE EQUALIZER controls

These controls regulate the low and high frequency response of line inputs. Clockwise rotation increases response; counterclockwise rotation decreases it. The center position provides a flat response. Adjust the tone according to the room acoustics or to the source sound.

❾ SPEAKERS selector

You can connect two series of speaker systems: A and B. This selector determines the series to be used.

To drive speaker system A (SP A), depress the selector.

To drive speaker system B (SP B), depress it again.

This selector is recessed to avoid accidental activation. Use a stick-like object to press the selector.

❿ MONITOR selector

You can monitor either the output sound or the line input with headphones by setting this selector.

LINE PFL (Pre-fader listening): Depress the selector to monitor the source sound from the LINE inputs. With this setting, you can monitor the line inputs without affecting the output level of the amplifier. This is useful when you want to prepare the next line input source while broadcasting a microphone sound.

- Be sure to set the LINE volume controls to 0 position while you are monitoring the line inputs. Otherwise the source sound being monitored will be mixed with the microphone sound being distributed.

MASTER OUT: Release the selector to monitor the output signal of the amplifer. (The depressed selector will be released when it is pressed again.)

This function is useful when the amplifier and the speaker systems are placed in different rooms.

When the MASTER VOLUME control is set to 0, no sound can be heard through the headphones.

⓫ HEADPHONES jack and level control

Insert the headphones into the jack. The headphones volume is controlled by the level control.

This level control has no effect upon the output level of the amplifier.

Note: Be sure to turn down the headphones volume entirely, before you operate the MONITOR selector. The headphones volume may differ greatly according to the MASTER VOLUME control setting when you switch the MONITOR selector from LINE PFL to MASTER OUT or vice versa.

⓬ MIC input controls

Adjust the microphone levels. The numbers above the controls correspond to those of the input connectors.

Clockwise rotation increases the level and counterclockwise rotation decreases it. The internal circuits are designed so that the nominal output will be obtained with the rated input when this control is set to 7.

⓭ LINE input level controls

Adjust the levels of the LINE inputs. The knob "1" is for the LINE-1 input and the knob "2" is for the LINE-2. Clockwise rotation increases the sound level and counterclockwise rotation decreases it. Position 7 provides the reference level.

⓮ LINE-2 input SELECTOR

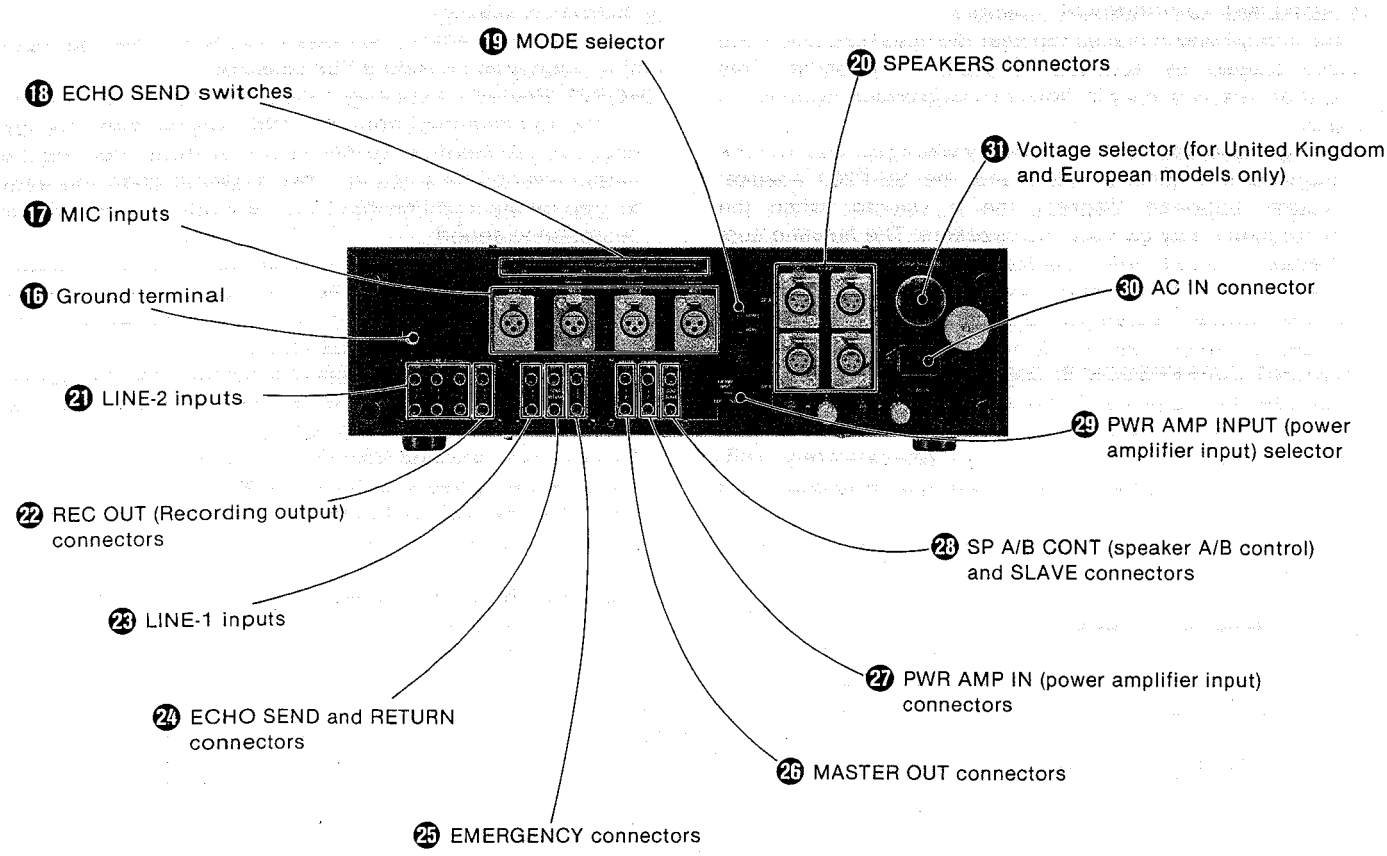
Selects the program source for the LINE-2 input.

PHONO: for record programs
TAPE: for taped programs
AUX: for auxiliary source programs

⓯ MASTER VOLUME control

Regulates the overall sound level of the output.

Clockwise rotation increases the sound level and counterclockwise rotation decreases it. Position 7 provides the reference level. Be sure to lower the volume whenever you turn the amplifier on or off, or before making system connections.


⑲ MODE selector
⑳ SPEAKERS connectors
⑱ ECHO SEND switches
㉛ Voltage selector (for United Kingdom and European models only)
⑰ MIC inputs
⑯ Ground terminal
㉚ AC IN connector
㉑ LINE-2 inputs
㉙ PWR AMP INPUT (power amplifier input) selector
㉒ REC OUT (Recording output) connectors
㉘ SP A/B CONT (speaker A/B control) and SLAVE connectors
㉓ LINE-1 inputs
㉗ PWR AMP IN (power amplifier input) connectors
㉔ ECHO SEND and RETURN connectors
㉖ MASTER OUT connectors
㉕ EMERGENCY connectors

⑯ Ground terminal
To prevent hum, be sure to connect the ground wire of the record player to this terminal. If hum still exists, it may be helpful to connect the terminal directly to a good ground via a ground rod.

⑰ MIC inputs
Only balanced type microphones should be connected to these connectors.
DC power (39 V with the USA model or 48 V with the European or Canadian model) is supplied to the microphones from the amplifier through these connectors, so that a condenser microphone which operates on external power can be used.
Note: Do not use an unbalanced type microphone. It may cause distortion or it may be damaged. A microphone which does not require any external power, such as a dynamic microphone, can be used as long as it has a balanced-type output.

⑱ ECHO SEND switches
Turn ON the switch corresponding to the microphone input to which you want to add a reverberation effect.
The microphone input signal selected will be supplied to a reverberator through the ECHO SEND connector and then returned through the RETURN connector.

⑲ MODE selector
Normally set this selector to STEREO. The MIC inputs will be in mono and the LINE inputs in stereo.
If the speaker placement is not suitable for stereo reproduction, set the selector to MONO, and all the source sounds will be reproduced in monaural.

⑳ SPEAKERS connectors
Connect the speaker systems. Two series of speakers can be connected: SP A and SP B. The SPEAKERS selector determines the speakers to be used.
The SP A connectors are XLR-4-31 type, and two types of connectors are provided for SP B series: XLR-4-31 type and normal screw type. These two are connected in parallel so that they can be used at the same time.
A speaker cable equipped with XLR-4-31 type connector is supplied with the Sony SS-P200 speaker system.
Note: Total load impedance of all the speaker systems must be 4 ohms or more. Since the two SP B connectors are connected in parallel, make sure that the total load impedance is more than 4 ohms when they are used at the same time.

㉑ LINE-2 inputs
PHONO: Connect to a record player. When you connect to a player with a MC cartridge, you need a transformer or a head amplifier.
TAPE: Connect to a tape recorder.
AUX: Connect to an auxiliary source such as a tuner, compact disc player, tape recorder, etc.

Note: When the LINE-2 SELECTOR at the front is set to TAPE, the REC OUT connectors are automatically disconnected. This is because feedback occurs when the tape recorder is set into the recording mode while tape input is selected. If you want to record while playing back a tape, use two tape recorders; one for recording and the other for playback, and connect the recorder for playback to AUX or LINE-1 input.

㉒ REC OUT (recording output) connectors
Connect a tape recorder for recording.
The MASTER VOLUME has no effect on the output level of this connector.

㉓ LINE-1 inputs
Connect a sound source such as a tape recorder, tuner, compact disc player, etc.

㉔ ECHO SEND and RETURN connectors
Connect a reverberator.
ECHO SEND: Connect to the input of the reverberator. Microphone input signal is output from this connector.
RETURN: Connect to the output of the reverberator. The sound with reverberation effect will be returned to the power amplifier.

㉕ EMERGENCY connectors
When you supply 24 V dc power to this connector, the output of the amplifier will be cut off. Use this connector when you need to deactivate the PA system immediately, as in the case of emergency, so that the usual broadcast system of the hall can be heard.

㉖ MASTER OUT connectors
Outputs the sound equalized and/or mixed with the PA-A200. The output level is controlled by the MASTER VOLUME control. The signal output from this connector is to be amplified by a power amplifier. Use this connector in the following cases:
- when you use only the mixing or equalizer function of this amplifier.
- when you want to amplify the signal with another power amplifier.
- when you use a second PA-A200 as a slave. Connect to the PWR AMP IN connector of the slave.

㉗ PWR AMP IN (power amplifier input) connector
Use this connector when you use only the power amplifier section of this amplifier. Connect the external program source to be amplified.
Note: Do not supply a source signal which includes dc voltage. Otherwise, the protection circuit will activate and cut off the output signal.

㉘ SP A/B CONT (speaker A/B control) and SLAVE connectors
Use these connectors when you drive two PA-A200's in parallel: one as a master and the other as a slave. Connect the CONT connector of the master to the SLAVE connector of the slave. The CONT connector outputs a control signal which selects the speaker system used with the slave and the SLAVE connector accepts this control signal.

㉙ PWR AMP INPUT (power amplifier input) selector
Selects the input signal for the power amplifier section.
Normally set this switch to INSIDE. If you want to use only the power amplifier section of the PA-A200, set this selector to EXT.

㉚ AC IN connector
Connect the supplied ac power cord.

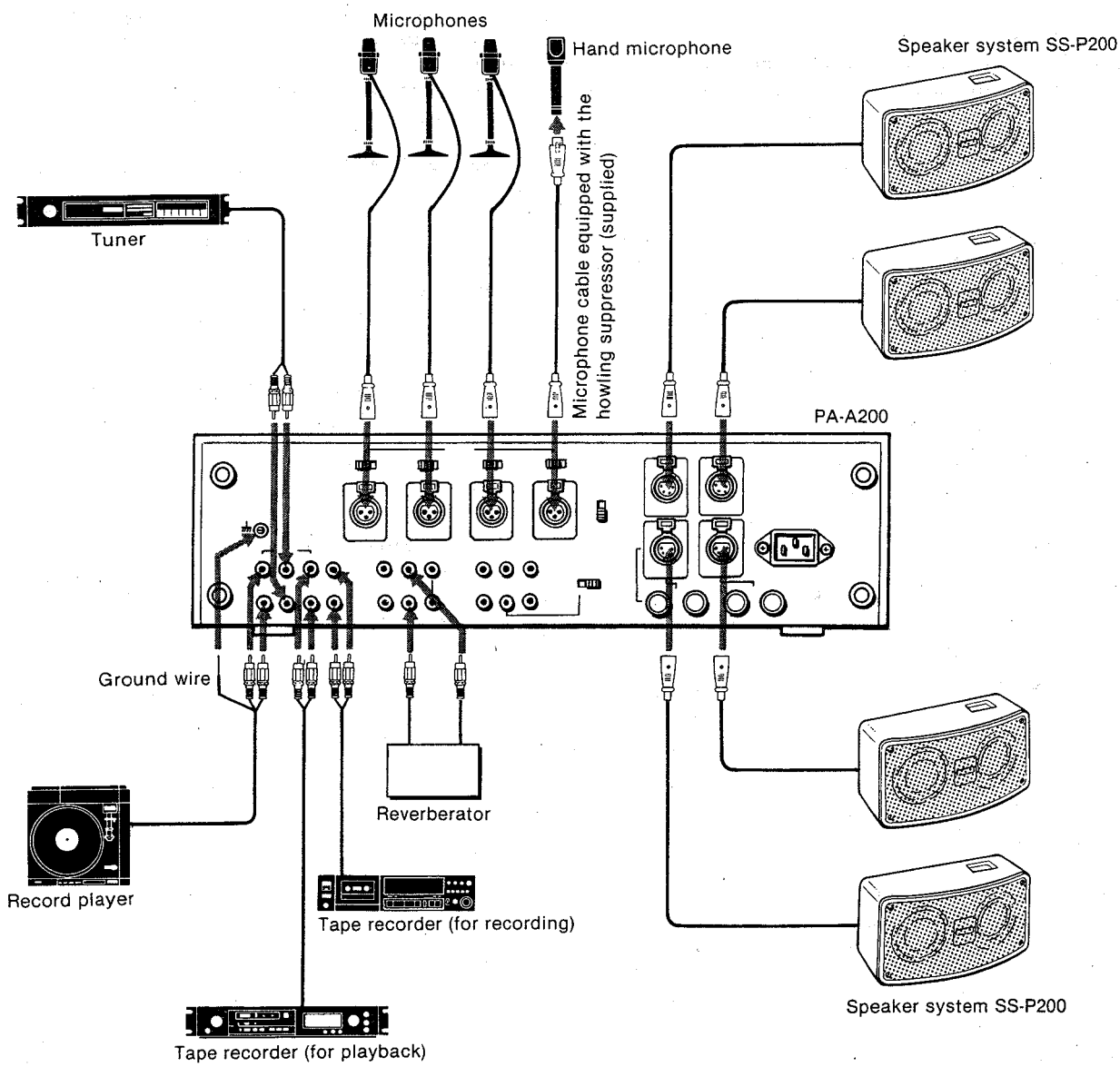
㉛ Voltage selector (for United Kingdom and European models only)
Set to the appropriate position according to your local power supply voltage. (See page 3.)

1-5. CONNECTIONS

Connection notes

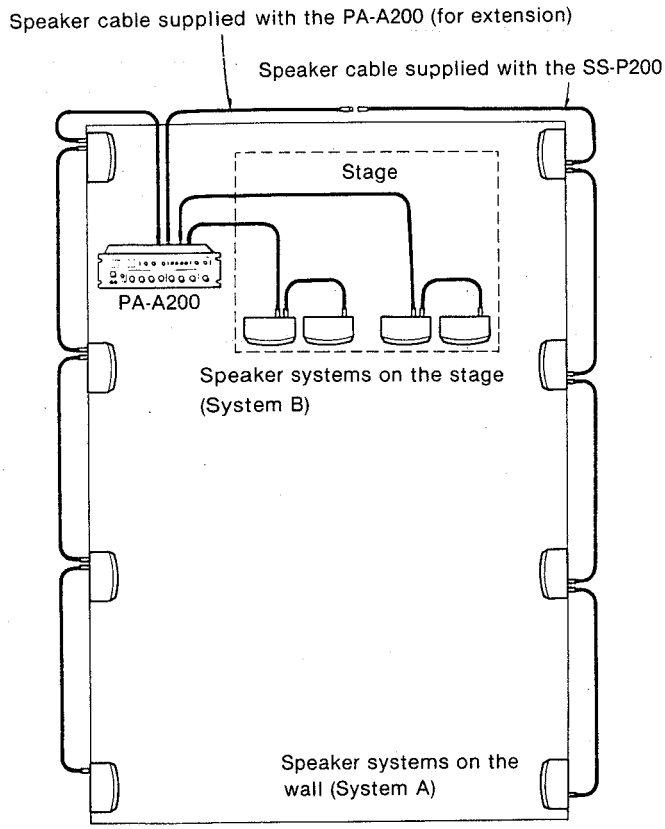
- Before making connections, make sure that the POWER switch of the amplifier is turned off.
- The cable connectors should be fully inserted into the jacks. A loose connection may cause hum and noise.
- To disconnect the microphone or speaker cable, be sure to press the tab on the plug. Do not force the cable.
- When connecting program sources, note that the upper row of the connectors on the amplifier are for left-channel connections and the lower row for right-channel.

Connection diagram



1-6. SPEAKER PLACEMENT

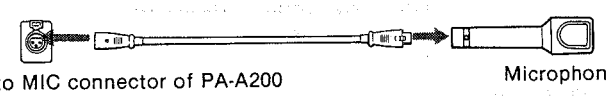
● Up to 4 pairs of SS-P200 speaker systems (optional) can be connected to a set of speaker connectors. Use the appropriate number of pairs according to the room area. As long as you drive the system within 4 pairs of SS-P200's, the amplifier and the speakers are protected against a clipping distortion even if you turn up the output level of the amplifier to its maximum.
● Two sets of speaker connectors, SP A and SP B, are provided for various speaker placement. The following illustration shows an example: system A is on the wall, and system B on the stage. Select the system to be driven depending on the program to be distributed.



● Do not use a speaker with a load impedance of less than 4ohms. Otherwise, the built-in output limiter circuit operates to protect the amplifier.
● Even if the amplifier of one channel fails, the other will continue to operate normally, so that the broadcasting will not be interrupted.

1-7. MICROPHONE PLACEMENT

● **Use a balanced type microphone only.** If an unbalanced type microphone is connected, it may be damaged.
● DC power is always output from each MIC connector. A condenser microphone which operates on external power is powered by simply inserting its plug into a MIC connector.

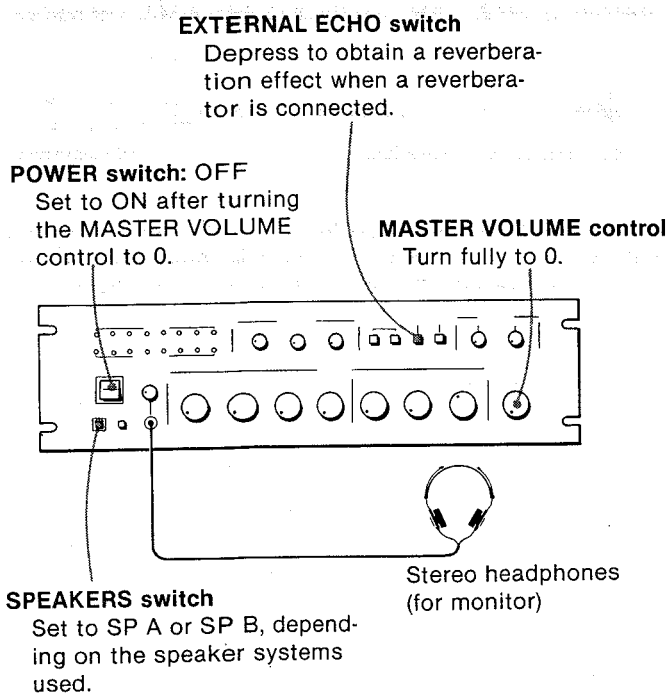


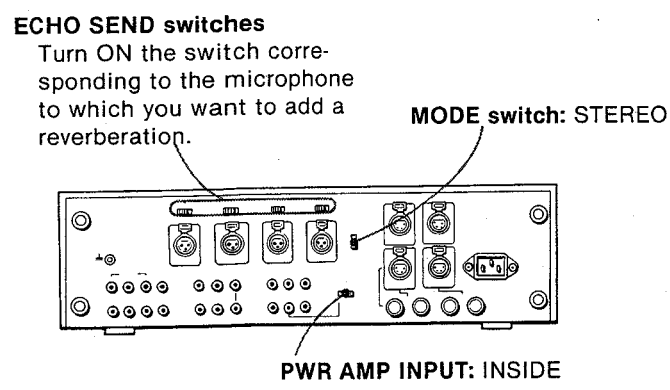
● When the microphone is to be carried along with the speaker, use the supplied ECP-5-3PHS microphone cable. This cable provides the howling suppressor A function.

1-8. TO GET SOUND

PREPARATION

Set the controls and switches as shown:


EXTERNAL ECHO switch
Depress to obtain a reverberation effect when a reverberator is connected.
POWER switch: OFF
Set to ON after turning the MASTER VOLUME control to 0.
MASTER VOLUME control
Turn fully to 0.
Stereo headphones (for monitor)
SPEAKERS switch
Set to SP A or SP B, depending on the speaker systems used.


ECHO SEND switches
Turn ON the switch corresponding to the microphone to which you want to add a reverberation.
MODE switch: STEREO
PWR AMP INPUT: INSIDE

TO BROADCAST SOUND

This amplifier has a mixing function, so that you can distribute the mixed sound of the microphone and line inputs. Be sure to turn down the volume of the input which is not to be distributed.

To mix the MIC inputs:

To broadcast several sources from the microphone at a time, adjust the MIC volume controls corresponding to the inputs to be used so that the desired balance of sources is obtained. Keep the volume controls which are not to be used at the 0 position.

To mix the LINE inputs:

You can mix two sources from the LINE-1 and LINE-2 inputs. The mixed line inputs can also be mixed with microphone inputs.

1 Select the desired source for the LINE-2 input with the LINE-2 selector.
2 Adjust the LINE-1 and/or LINE-2 volume controls to the desired balance of sources.

To get sound

Once the various sources are properly mixed by adjusting the corresponding volume controls, adjust the overall level with the MASTER VOLUME control, referring to the OUTPUT LEVEL indicator. When the indicator lights up to the "PEAK" position, the amplifier is operating at its maximum power. If the indicator continuously lights up to the "PEAK" position, lower the master volume, otherwise distortion may occur.

SOUND ADJUSTMENT

Adjust the tone to suit the acoustic characteristics of the room and the program sources, using the EQUALIZER controls.
Use the LINE EQUALIZER controls (LOW and HIGH) to adjust the LINE inputs, and the MIC EQUALIZER (LOW, MID and HIGH) for MIC inputs.

MODE SELECTION

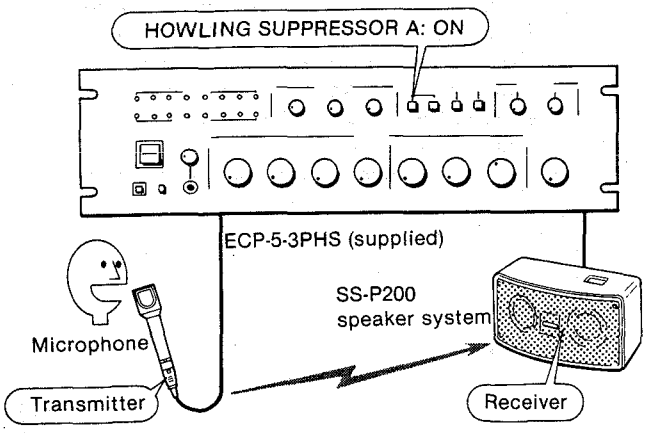
Normally set the MODE selector to STEREO. The MIC inputs will be provided in mono and the LINE inputs in stereo.
When the speaker placement is not suitable for stereo reproduction, set the selector to MONO. All the sources will be provided in monaural.

1-9. TO SUPPRESS HOWLING

The PA-A200 has two systems of howling suppression: HOWLING SUPPRESSOR A and B.

HOWLING SUPPRESSOR A

This system activates by detecting the distance between the microphone and the speaker. The microphone cable is equipped with a transmitter and the speaker has a receiver. If a microphone comes close to a speaker, the receiver in the speaker system picks up the signal sent by the transmitter in the microphone cable. If this happens, the built-in howling suppressor circuit immediately attenuates the output of the amplifier to the speaker by approximately 10 dB. When the amplifier is used with a SS-P200 speaker system as in the following illustration, HOWLING SUPPRESSOR A circuit can be utilized. To activate the circuit, press the HOWLING SUPPRESSOR A switch.



HOWLING SUPPRESSOR B

This system controls the output level of the amplifier according to the microphone input. When no input is supplied to the microphone, the level is attenuated by approximately 4 dB. When input begins again, the level will be restored automatically.

To activate the suppressor circuit,

1 Depress the HOWLING SUPPRESSOR B switch.
2 Set the MASTER VOLUME control to an appropriate position.
3 Output a source sound from the line input and adjust the LINE volume control to the normal position.
4 Put a microphone approximately 4 meters away from a speaker.
5 Turn up the MIC volume control. If howling occurs, turn down the volume until the howling stops.
6 Move the microphone closer to the speaker up to a distance of 2.5–3 meters. When the microphone volume is set correctly, the speaker volume will be reduced at a certain point. If howling occurs, turn down the microphone volume so that the howling does not occur before the speaker volume is reduced.

Now the maximum volume of microphone is set. Howling will not occur if you use the system within this maximum volume setting.

Notes on howling suppressor

- The two howling suppressor systems, A and B, can be activated at the same time. If howling remains after one of the two systems is activated, turn on the other system.
- System A operates only when you use both the ECP-5-3PHS microphone cable (supplied) and the SS-P200 speaker system (optioanl). System B operates whatever microphone cable and speaker system is used. In additon, system A is effective only when the microphone is close to the speaker.
- The howling suppressor A circuit operates by using a 78.75 kHz signal. Since the signal which the system radiates is very weak, it has no effect upon other equipment. However some video equipment may radiate a signal of this range and so may interfere with proper operation of the suppressor A circuit.

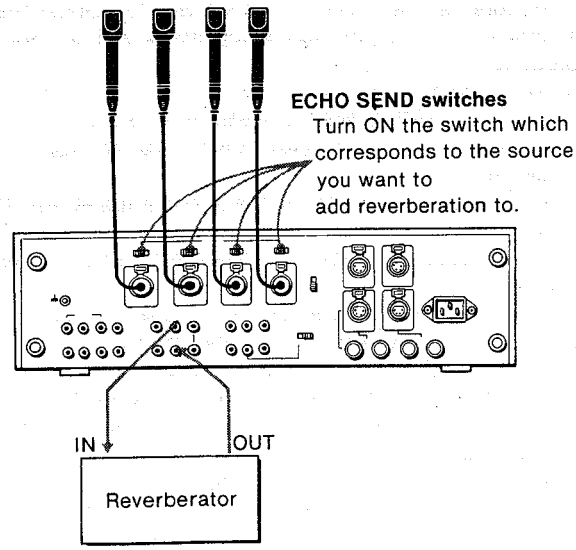
If the speaker volume is decreased although the microphone is not close to the speaker, try one of the followings:

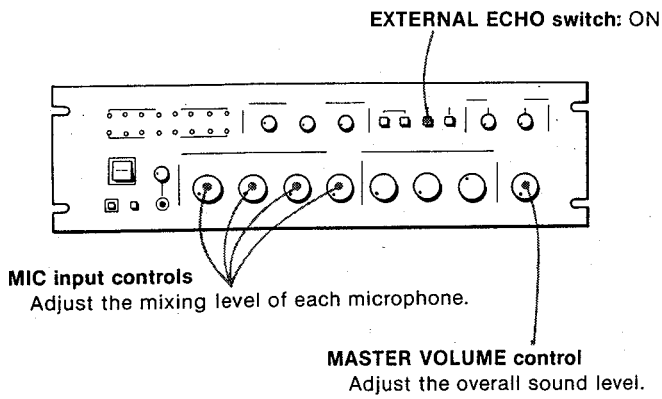
- Place the video equipment at a distance from the speaker.
- Change the position of the video equipment and the speaker.
- Change the direction of the video equipment and the speaker face.

If the interference persists after you have made these changes, use the howling suppressor B circuit only or consult your nearest Sony dealer.

1-10. TO GET A REVERBERATION EFFECT

A reverberation effect can be added to microphone inputs by connecting a reverberator.


ECHO SEND switches
Turn ON the switch which corresponds to the source you want to add reverberation to.
IN
OUT
Reverberator

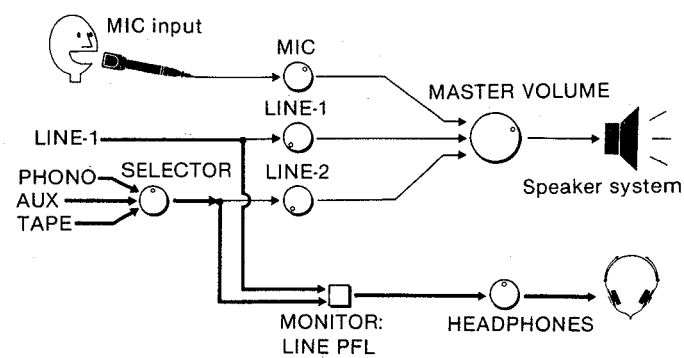

EXTERNAL ECHO switch: ON
MIC input controls
Adjust the mixing level of each microphone.
MASTER VOLUME control
Adjust the overall sound level.

1-11. BGM AUTOMUTE FUNCTION

This function is useful when background music is being provided from the LINE-1 or LINE-2 connectors.
Depress the BGM AUTOMUTE switch; the volume of the backgrond music is reduced by approximately 20 dB when a signal is input from the microphone. This allows the listeners to hear the microphone sounds clearly.
When the MIC input stops, the backgound music returns to the level previously set.

1-12. TO MONITOR THE SOUND

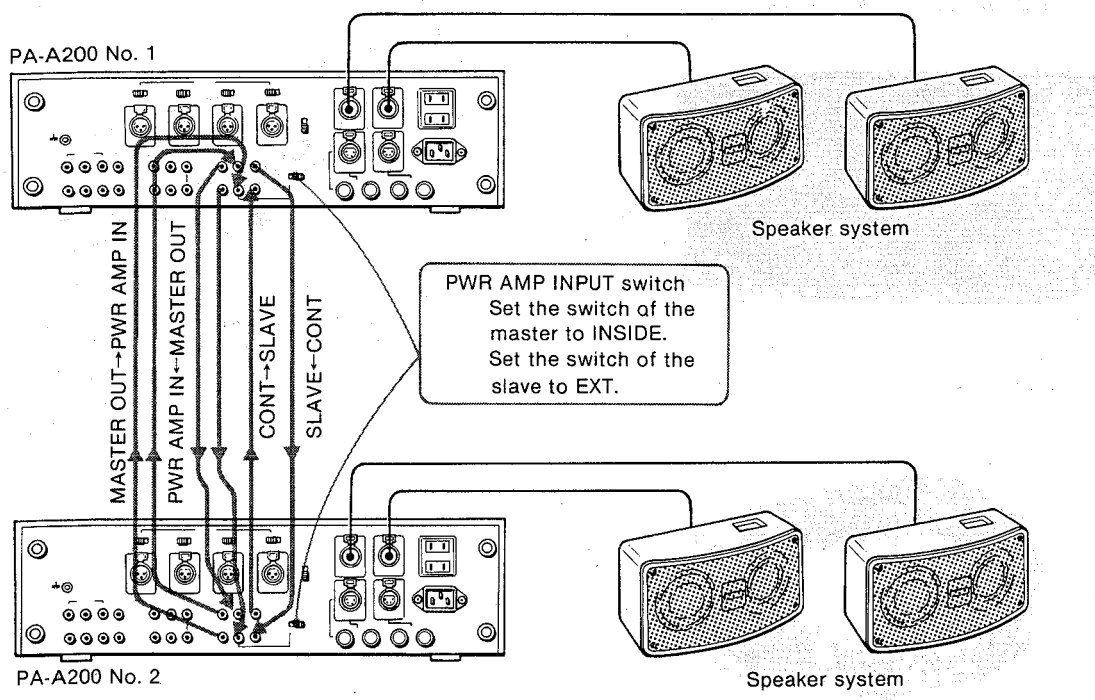
You can monitor either the sound distributed from the speakers or the source sound from the LINE inputs.
Insert the headphones into the HEADPHONES jack and adjust the volume with the HEADPHONES VOLUME control.
To monitor the sound output from the amplifier, set the MONITOR selector to MASTER OUT. If you set the selector to LINE PFL (pre-fader listening), you can monitor the source sound from the LINE inputs. In this case, the volume control section (LINE volume, MASTER VOLUME, and LINE EQUALIZER) has no effect upon the headphones sound. If you set the LINE volume controls to 0, you can prepare the program source to be distributed next without affecting the sound being distributed.



1-13. TO DRIVE TWO PA-A200'S

If you connect two PA-A200's as shown below, you can drive two amplifiers at a time, one as a master and the other as a slave. In this system, all the controls of the system, such as the sound adjustment or the speaker selection, will be performed by the master; the slave operates as a simple power amplifier.

With this system, the two amplifiers can also be driven independently by simply switching the PWR AMP INPUT switches of both amplifiers to INSIDE.



Operating example

1 Set the PWR INPUT switch of the first PA-A200 to INSIDE, so that it operates as the master.
2 Set the PWR INPUT switch of the second to EXT. This operates as the slave.
3 Adjust the sound level and the tone quality of the program source with the controls of the master.
4 Select the speaker system to be used with the slave amplifier by the SPEAKERS switch of the master. This control signal is supplied from the CONT connector of the master to the SLAVE connector of the slave. If this connection is not made, speaker system A is automatically selected for the slave.

1-14. EMERGENCY ANNOUNCEMENT

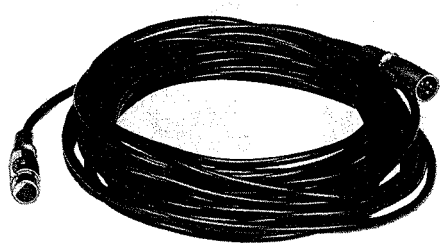
This amplifier has an EMERGENCY jack. When dc 24V power is supplied to this jack, the output to the speaker systems will be cut off, so that the listeners can hear an emergency announcement distributed by the usual broadcast system of the room.

1-15. OPTIONAL ACCESSORIES

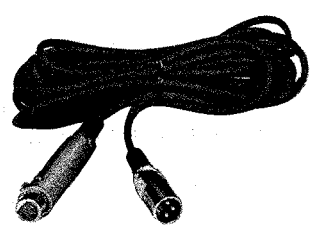
Speaker system SS-P200

Speaker units: Full-range, 16 cm (6½ inches), cone type (2)
Power handling capacity:
Nominal 20 W DIN-45500
Maximum 40 W
Output sound pressure level:
93 dB (1 W, 1 m)
(A speaker stand for the SS-P200 is also optional.)

Speaker cable RK-10-4P (10 m) Equipped with Cannon connector (equivalent).

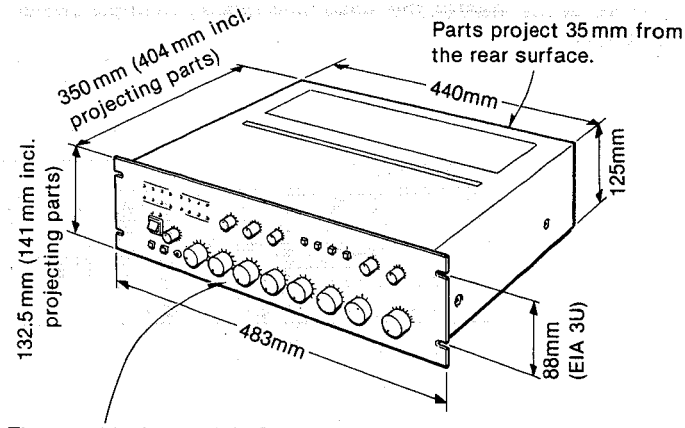


Microphone cable ECP-5-3PHS (5 m)
Including a transmitter for the howling suppressor A.
Equipped with Cannon connector (equivalent).



1-16. RACK MOUNTING

The PA-A200 is designed to be mounted in a 19-inch EIA standard rack.

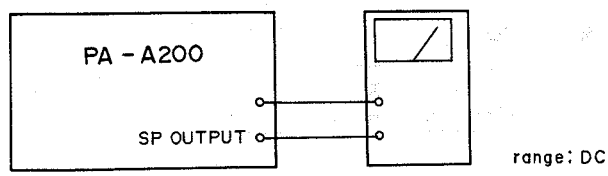

350 mm (404 mm incl. projecting parts)
Parts project 35 mm from the rear surface.
440mm
125mm
132.5 mm (141 mm incl. projecting parts)
483mm
88mm (EIA 3U)

The panel is 4 mm thick. Parts project 19 mm from the surface of the front panel.

The feet project 8.5 mm from the surface of the bottom. They can be removed if necessary.

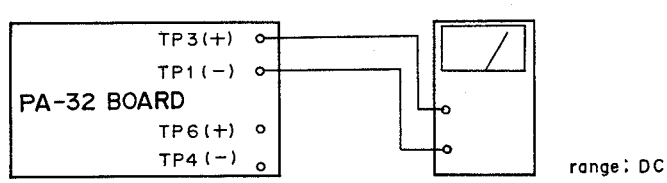
SECTION 2
ELECTRICAL ADJUSTMENTS

2-1. POWER AMP. CIRCUIT OFFSET VOLTAGE ADJUSTMENT



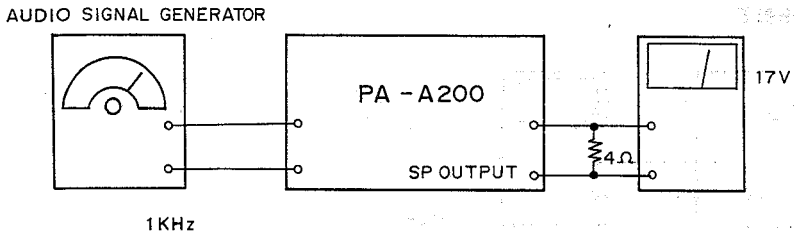
Machine conditions for adjustment	Spec.	Adjustment	Procedure
• PA-32 board • No input mode.	CH-L: less than 25 mV	⊘RT302	CH-L: Adjust RT302 so that voltage of the SP terminal or between TR2 and GND is less than 25 mV.
	CH-R: less than 25 mV	⊘RT602	CH-R: Adjust RT602 so that voltage of the SP terminal or between TP5 and GND is less than 25 mV.

2-2. POWER AMP. CIRCUIT BIAS CURRENT ADJUSTMENT (PA-32 BOARD)



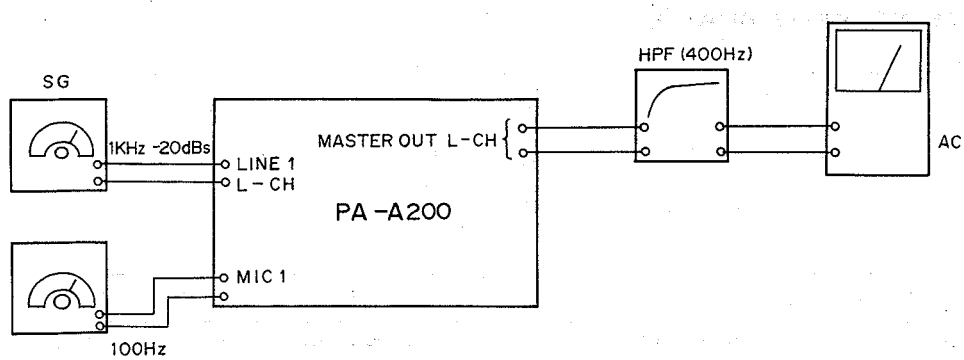
Machine conditions for adjustment	Spec.	Adjustment	Procedure
• Allow the system more than an hour aging period in 16W (4Ω) × 2 output mode before adjustment. • No input mode during adjustment.	CH-L: TP3 (+), TP1 (−) } 8.8 mV ± 1 mV	⊘RT301	Adjust voltage between TP3 (+) and TP1 (−).
	CH-R: TP6 (+), TP4 (−) } 8.8 mV ± 1 mV	⊘RT601	Adjust voltage between TP6 (+) and TP4 (−).

2-3. LED METER LEVEL ADJUSTMENT (EQ-4 BOARD)



Machine conditions for adjustment	Spec.	Adjustment	Procedure
• Set the MODE SW to MONO. • Adjust the audio signal generator so that voltage of the SP terminal is 17V. • Set the MASTER VR to 7.	CH-L: "PEAK" LED should light up.	⊘RT401 (EQ-4 board)	Adjust RT501 so that the "PEAK" LED lights up.
	CH-R: "PEAK" LED should light up simultaneously with CH-1.	⊘RT402 (EQ-4 board)	Adjust RT402 so that the "PEAK" LED lights up simultaneously with CH-1.

2-4. BGM AUTOMUTE ADJUSTMENT (EQ-4 Board)



When a signal is input to the MIC system under the condition that a signal is output from the LINE system, output from the LINE system decreases. Adjust the decreased output level.

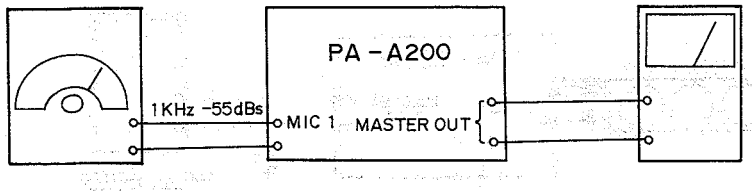
Check before adjustment

1. Turn RT804 (EQ-4 board) to the maximum (clockwise).
2. Input a 1 kHz signal and −20 dBs signal to LINE 1 L-CH.
3. Connect a level meter to the MASTER OUT terminal L-CH via H.P.F.
4. Turn the LINE 1 VOLUME and MASTER VOLUME to the maximum.
5. Check that the output level of the MASTER OUT L-CH is −5 dBs ± 1.5 dBs.
6. Turn on the BGM AUTOMUTE switch.
7. Keep the LINE 1 input remain as it is and input a 100 Hz signal to MIC 1. Check that the input level of a 100 Hz signal is −73 dBs ± 3 dBs and 1 kHz output decreases.

Adjustment

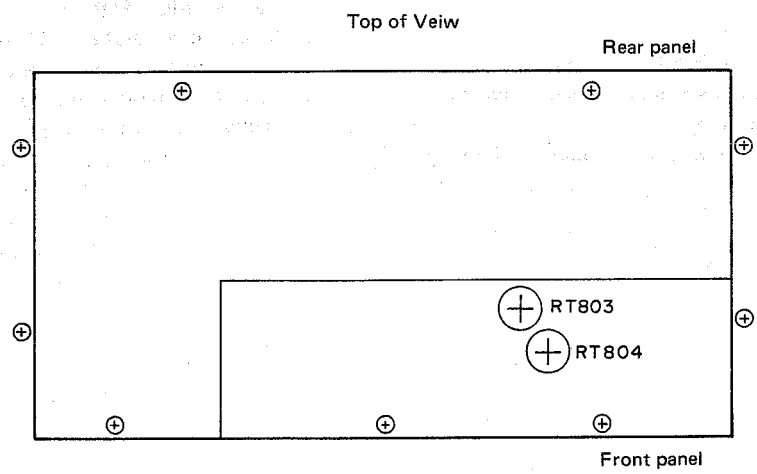
Adjust RT803 (EQ-4 board) so that the level of the 1 kHz output decreases to −25 dBs.

2-5. HOWLING SUPPRESSOR(B) ADJUSTMENT

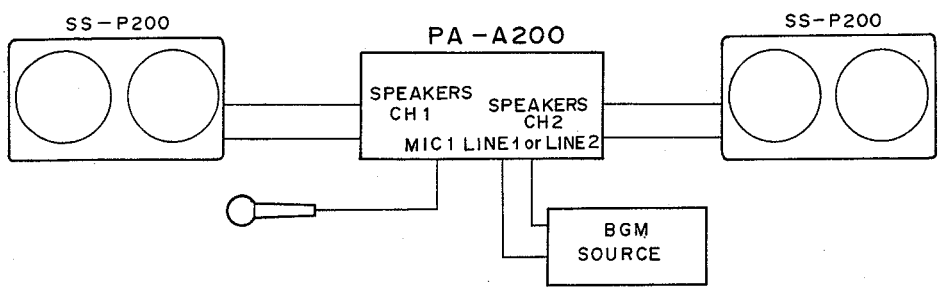


1. Input a 1 kHz signal and a −55 dBs signal to MIC 1.
2. Turn the MASTER VOLUME to the maximum and check the master out by the level meter.
3. Adjust the MIC 1 VOLUME so that the level of the MASTER OUT is +5 dBs.
4. Turn on the HOWLING SUPPRESSOR (B) switch.
5. Turn RT801 on the EQ-4 board to the maximum (clockwise).
6. Adjust RT802 on the EQ-2 board so that the level meter indicates 0 dBs.
7. Connect TP7 to TP8 on the EQ-4 board.
8. Adjust RT801 on the EQ-4 board so that the level meter indicates +5 dBs.
9. Disconnect TP7 from TP8.
10. Adjust RT802 so that the level meter indicates between +0.8 dBs and +1.2 dBs.

2-6. BGM AUTOMUTE ADJUSTMENT



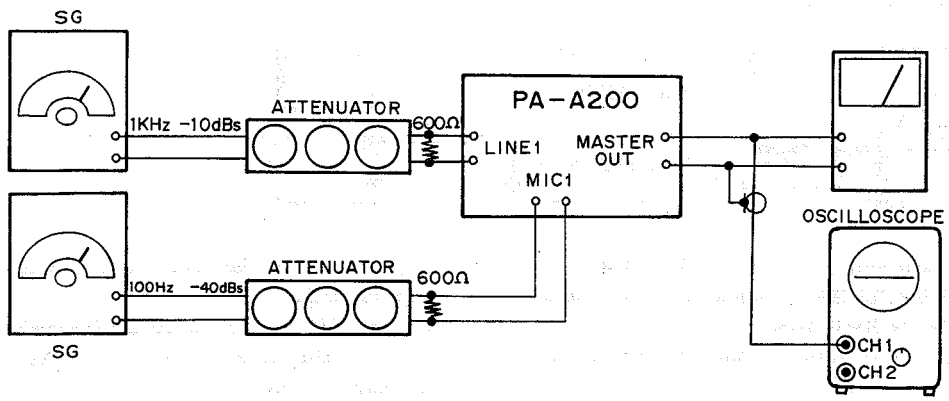
Loosen the 9 screws and remove the upper plate.



1. To adjust sensitivity
   The output level of the background music may reduce due to background noise when there is no announcement input to the microphone. In this case, adjust sensitivity by RT804, which is preset to the rightmost to offer the heighest sensitivity. Therefore, turn RT804 counterclockwise to lower sensitivity.

2. To adjust muting level and recovery time
   Recovery time of the background music can be adjusted by RT803. RT803 is preset to the leftmost. Therefore, turn RT803 to clockwise to make the recovery time long. Simultaneously, muting level is reduced.
   Note: If you turn too much, the background music does not recover. Turn RT803 so that the background music recovers to the level previously set.

3. For fine adjustment



4. To adjust sensitivity
   1) Set the MASTER VOL. to 7.
   2) Adjust the LINE 1 VOL. so that the output level is 20 dB.
   3) Set the MIC1 VOL. to 8.
   4) Turn on the BGM AUTOMUTE switch.
   5) Confirm that a 1 kHz component at output attenuates.
   6) Adjust sensitivity by RT804.

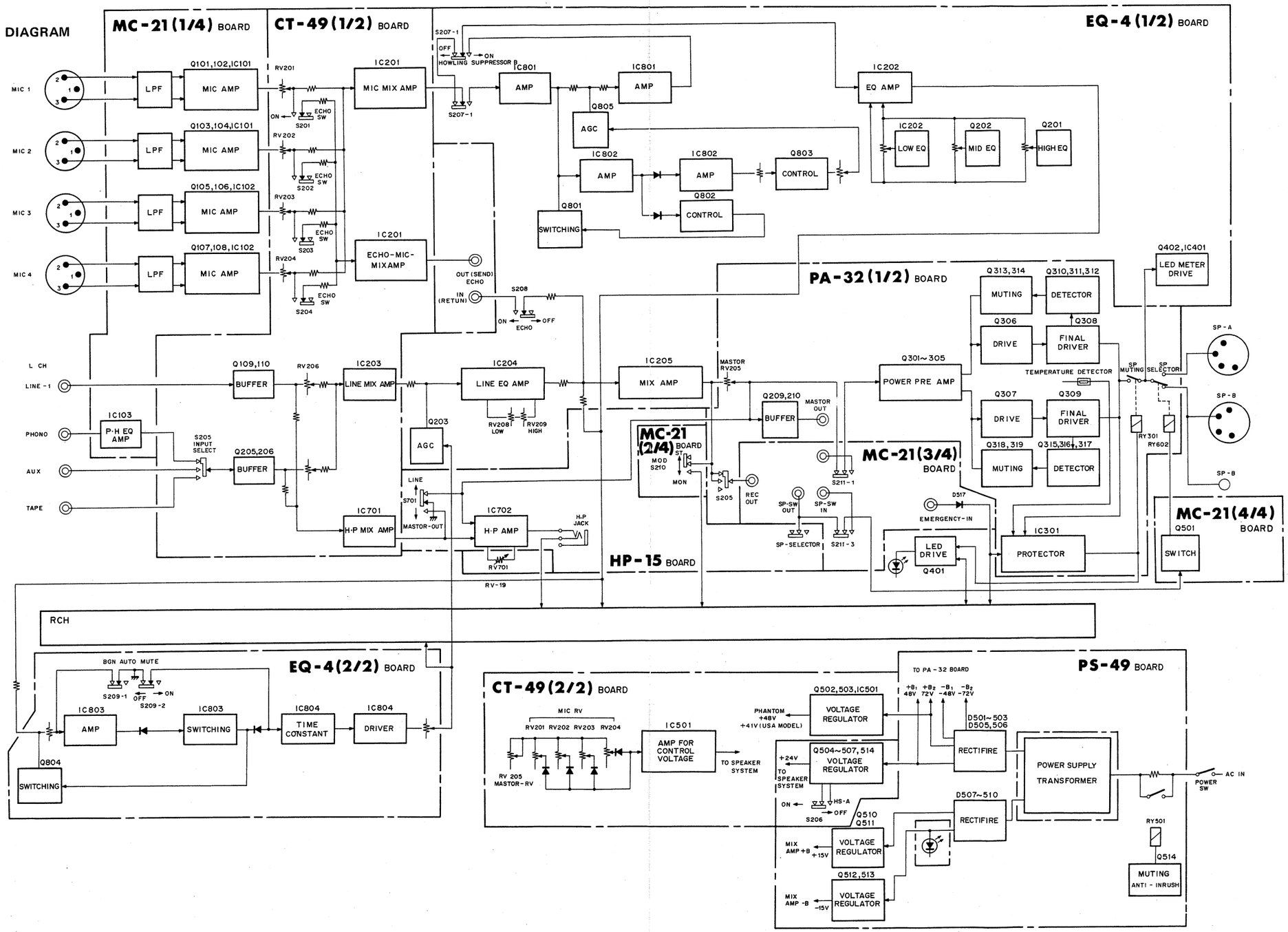
   Note: Sensitivity is preset to the highest. Turning RT804 counterclockwise, sensitivity can be lowered by 21 dB.

5. To adjust the muting level and recovery time
   1) Set the MASTER VOL. to 7.
   2) Turn on the BGM AUTOMUTE switch.
   3) Set the MIC1 VOL. to 8.
   4) Turn on the BGM AUTOMUTE switch.
   5) Confirm that a 1 kHz component at output attenuates.
   6) Adjust the muting level and recovery time by RT803.

   Note: The muting level is preset to a minimum of approximately −20 dB and the recovery time to 3 seconds as well. By RT804, the muting level can be adjusted to approximately −27 dB and the recovery time to ∞.

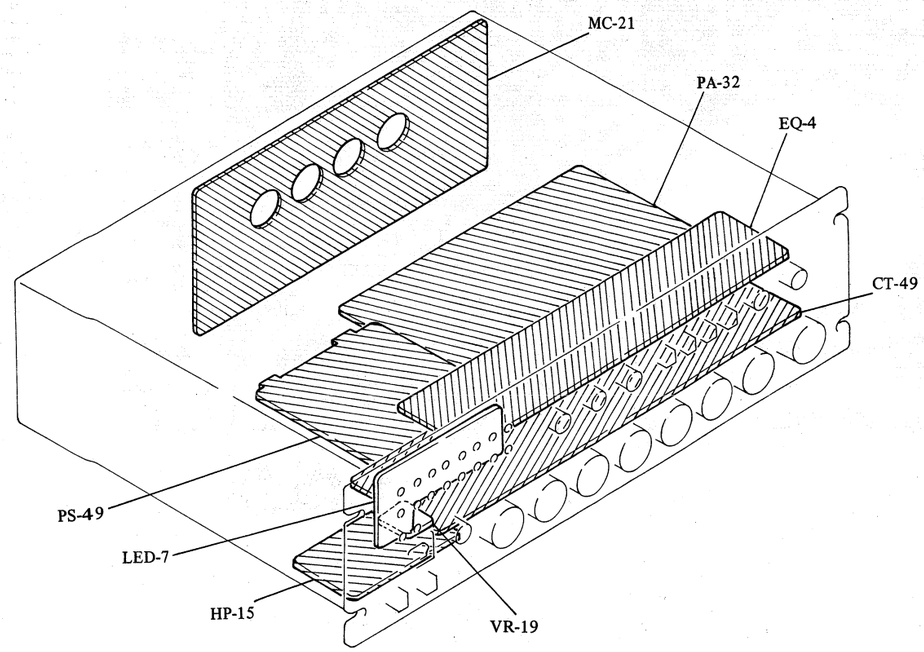
SECTION 3
BLOCK DIAGRAM

OVERALL BLOCK DIAGRAM

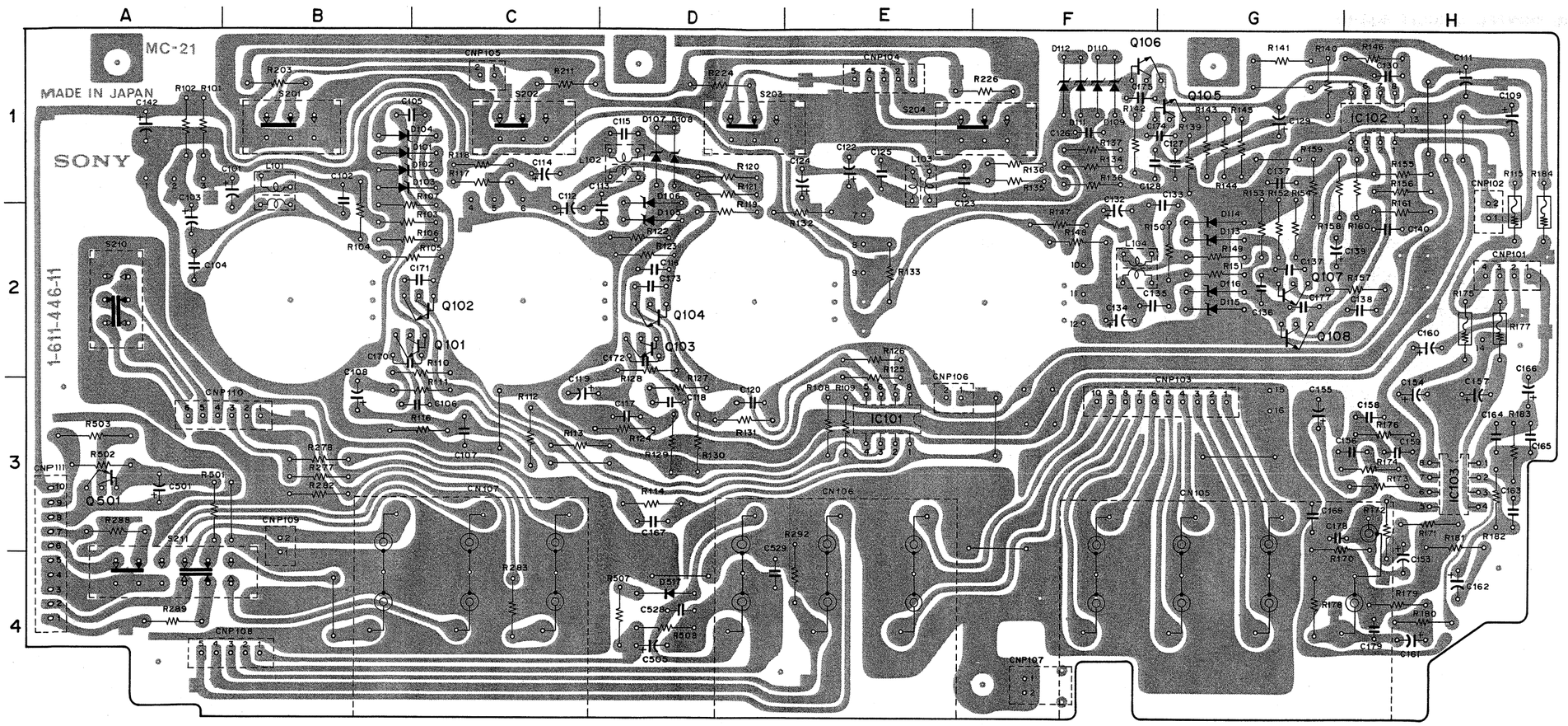


SECTION 4
PRINTED WIRING BOARDS AND SCHEMATIC DIAGRAM

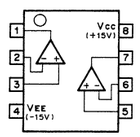
LOCATION OF THE PRINTED CIRCUIT BOARD

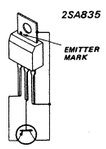


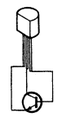
MC-21 (MC AMP)

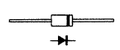


RC4560
OPERATIONAL AMPLIFIER
— TOP VIEW —





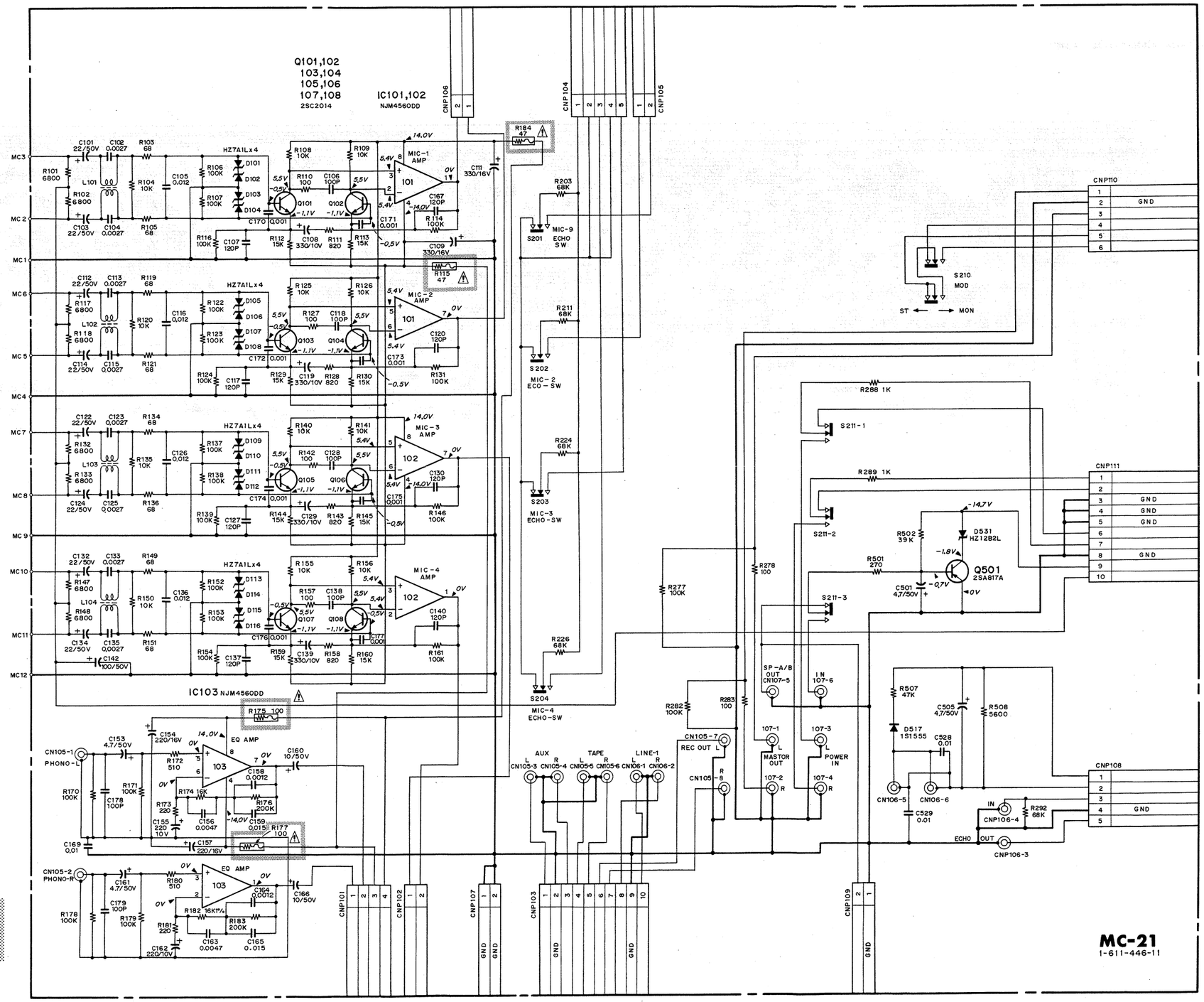




MC-21 – SOLDERING SIDE –
1-611-446-11
PA-A200

CN105	G	4
CN106	E	4
CN107	C	4
CNP101	H	2
CNP102	H	2
CNP103	G	3
CNP104	E	1
CNP105	C	1
CNP106	E	3
CNP107	F	4
CNP108	B	4
CNP109	B	3
CNP110	B	3
CNP111	A	4
D101	B	1
D102	B	1
D103	B	1
D104	B	1
D105	D	2
D106	D	2
D107	D	1
D108	D	1
D109	F	1
D110	F	1
D111	F	1
D112	F	1
D113	G	2
D114	G	2
D115	G	2
D116	G	2
D517	D	4
IC101	E	3
IC102	H	1
IC103	H	3
Q101	B	2
Q102	C	2
Q103	D	2
Q104	D	2
Q105	G	1
Q106	F	1
Q107	G	2
Q108	G	2
Q501	A	3
S201	B	1
S203	D	1
S204	E	1
S210	A	2
S211	B	4

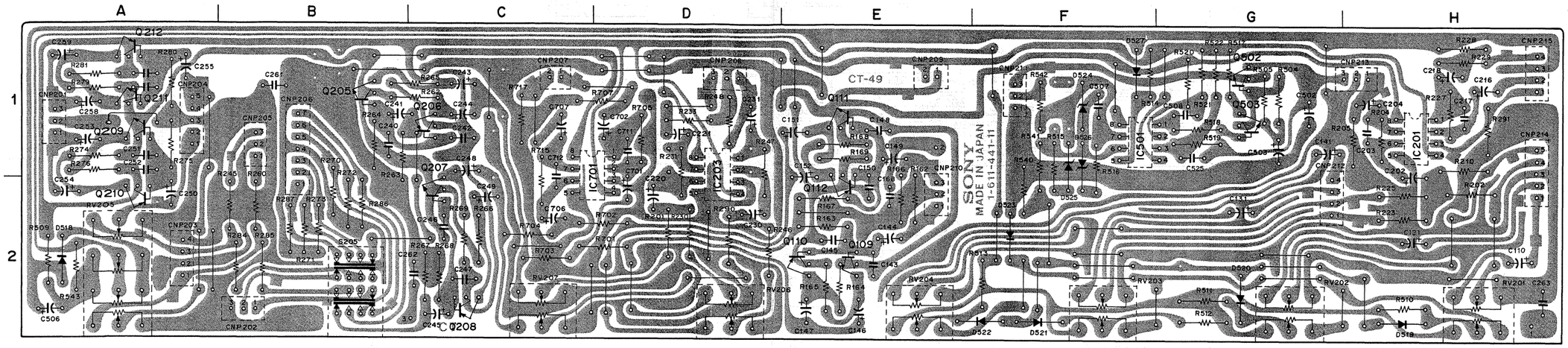
MC-21 (MC AMP)



The shaded and ⚠-marked components are critical to safety.
Replace only with same components as specified.

MC-21
1-611-446-11

CT-49 (CONTROL AMP)

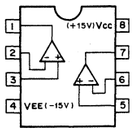


CNP201 A - 1	D518 A - 2	IC201 H - 1	Q210 A - 2
CNP202 B - 2	D519 H - 2	IC203 D - 1	Q211 A - 1
CNP203 A - 2	D520 G - 2	IC501 F - 1	Q212 A - 1
CNP204 A - 1	D521 F - 2	IC701 C - 1	Q502 G - 1
CNP205 B - 1	D522 F - 2		Q503 G - 1
CNP206 B - 1	D523 F - 2	Q109 E - 2	
CNP207 C - 1	D524 F - 1	Q110 E - 2	RV201 H - 2
CNP208 D - 1	D525 F - 1	Q111 E - 1	RV202 G - 2
CNP209 E - 1	D527 F - 1	Q112 E - 1	RV203 F - 2
CNP210 E - 2		Q205 B - 1	RV204 E - 2
CNP211 F - 1		Q206 C - 1	RV206 D - 2
CNP212 G - 2		Q207 C - 2	RV207 C - 2
CNP213 H - 1		Q208 C - 2	
CNP214 H - 1		Q209 A - 1	S205 B - 2
CNP215 H - 1			

CT-49 – SOLDERING SIDE –
1-611-441-11
PA-A200

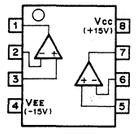
NJM4558D

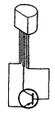
RC4558
OPERATIONAL AMPLIFIER
— TOP VIEW —



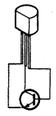
NJM4560D

OPERATIONAL AMPLIFIER
— TOP VIEW —

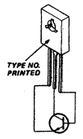




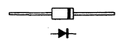
2SA872



2SC1775
(2SD666A)

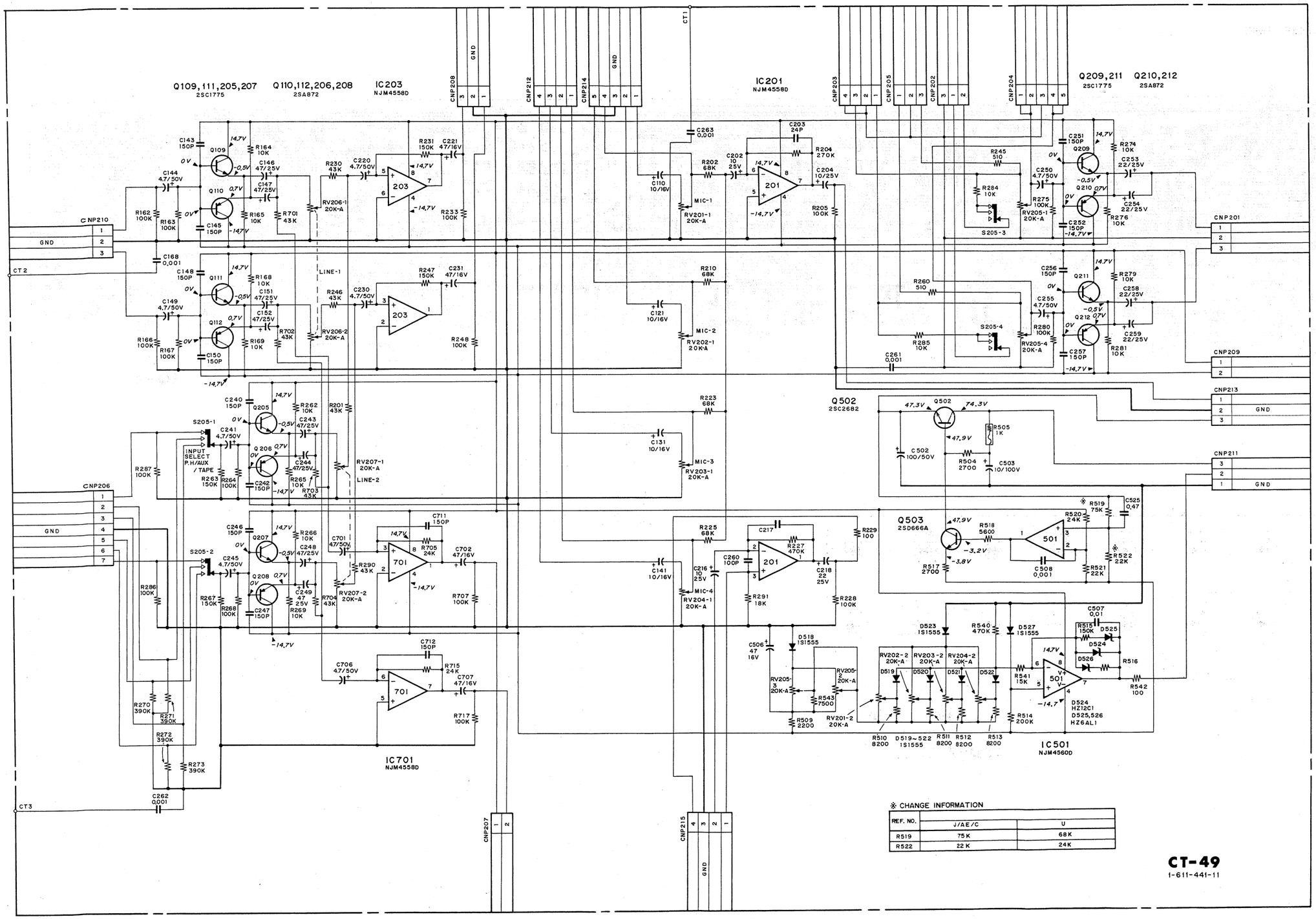


(2SC2682)

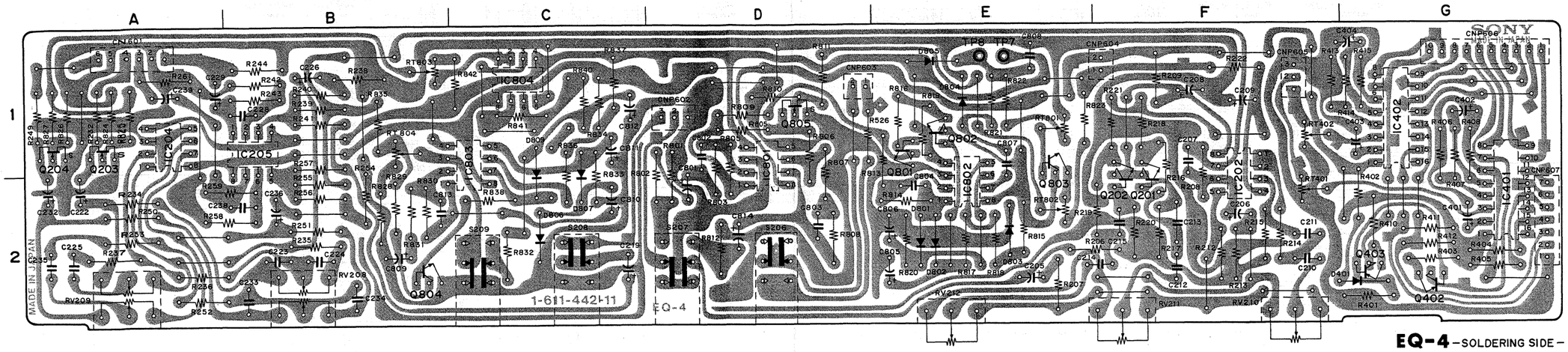


1S1555
HZ12A1L
HZ12C1

CT-49 (CONTROL AMP)

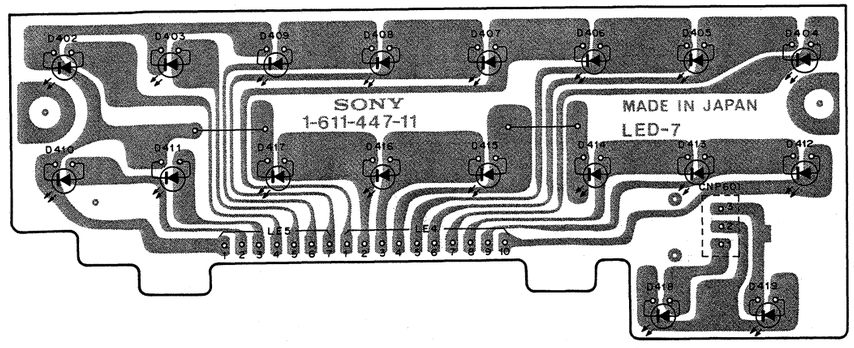


EQ-4 (EQUALIZER AMP)
LED-7 (LED)



EQ-4 – SOLDERING SIDE –
1-611-442-11
PA-A200

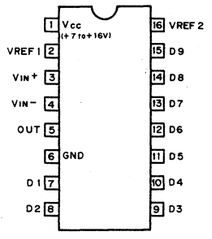
CNP601	A - 1	D805	E - 1	Q201	F - 2	RT401	F - 1	S206	D - 2
CNP602	D - 1	D806	C - 2	Q202	F - 2	RT402	F - 1	S207	D - 2
CNP603	D - 1	D807	C - 1	Q203	A - 1	RT801	E - 1	S208	C - 2
CNP604	F - 1	D809	C - 1	Q204	A - 1	RT802	E - 2	S209	C - 2
CNP605	F - 1			Q402	G - 2	RT803	B - 1		
CNP606	G - 1	IC202	F - 2	Q403	G - 2	RT804	B - 1	TP7	E - 1
CNP607	G - 2	IC204	A - 1	Q801	E - 1			TP8	E - 1
		IC205	B - 1	Q802	E - 1	RV208	B - 2		
D401	G - 2	IC401	G - 2	Q803	E - 1	RV209	A - 2		
D801	E - 2	IC402	G - 1	Q804	B - 2	RV210	F - 2		
D802	E - 2	IC801	D - 1	Q805	D - 1	RV211	F - 2		
D803	E - 2	IC802	E - 2			RV212	E - 2		
D804	E - 1	IC803	C - 1						
		IC804	C - 1						

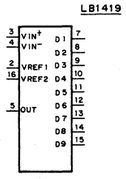


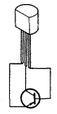
LED-7 – SOLDERING SIDE –
1-611-447-11
PA-A200

LB1419

MONOLITHIC LED LEVEL METER DRIVER
— TOP VIEW —

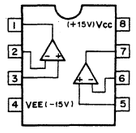






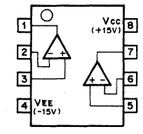
NJM4558D

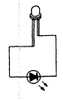
RC4558
OPERATIONAL AMPLIFIER
— TOP VIEW —



NJM4560D

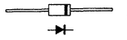
OPERATIONAL AMPLIFIER
— TOP VIEW —



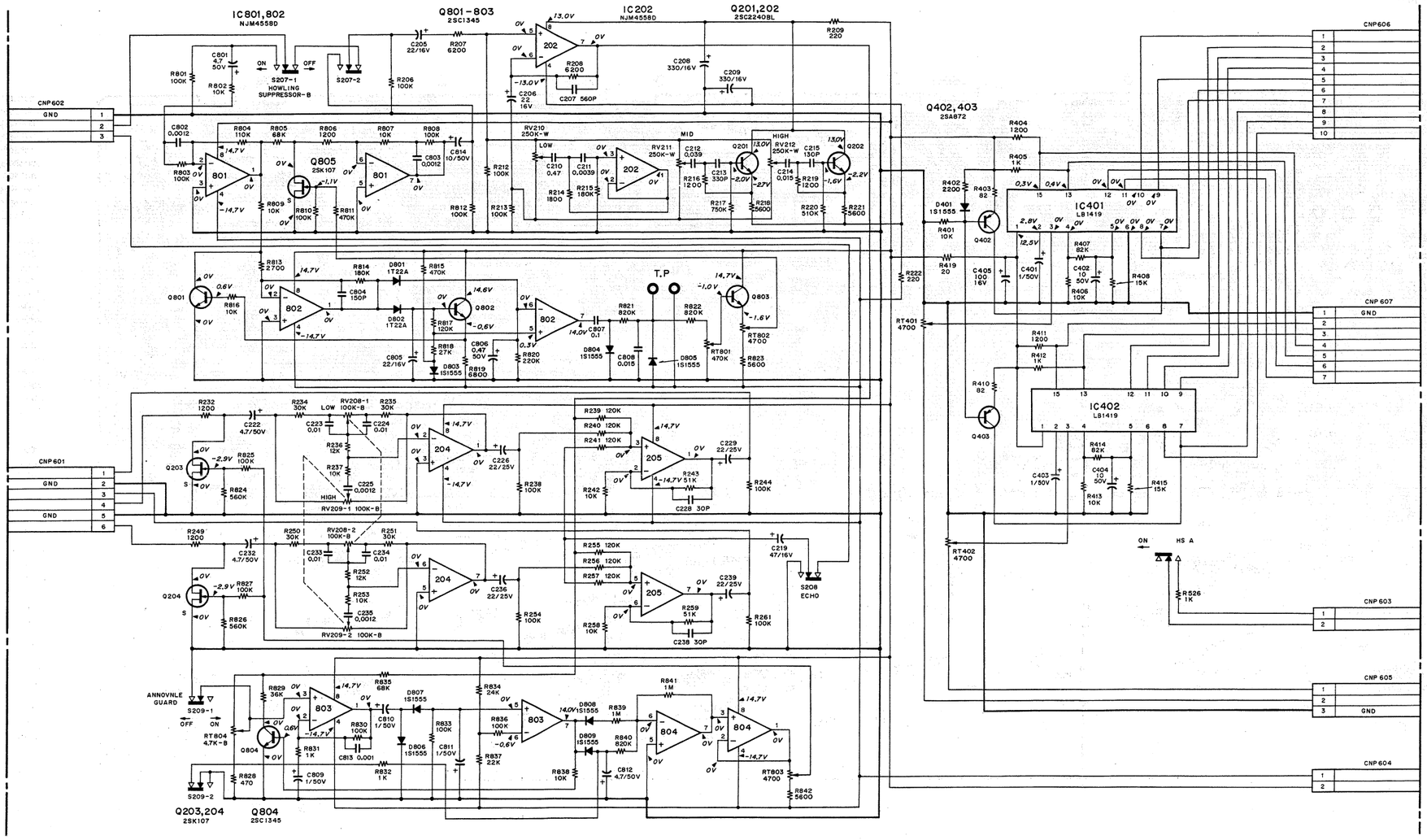


	−18	−15	−12	−9	−6	−3	0	+3	+6	dB
D9	0	0	0	0	0	0	0	0	0	1
D8	0	0	0	0	0	0	0	0	1	1
D7	0	0	0	0	0	0	0	1	1	1
D6	0	0	0	0	0	0	1	1	1	1
D5	0	0	0	0	0	1	1	1	1	1
D4	0	0	0	0	1	1	1	1	1	1
D3	0	0	0	1	1	1	1	1	1	1
D2	0	0	1	1	1	1	1	1	1	1
D1	0	1	1	1	1	1	1	1	1	1

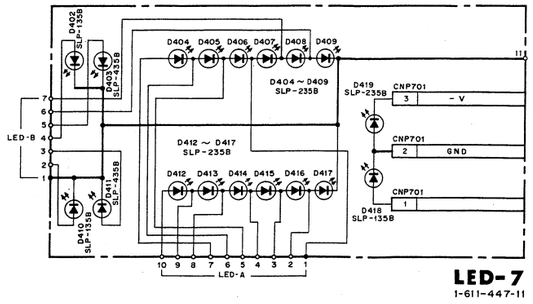
COMPARATOR LEVEL



EQ-4 (EQUALIZER AMP)
LED-7 (LED)

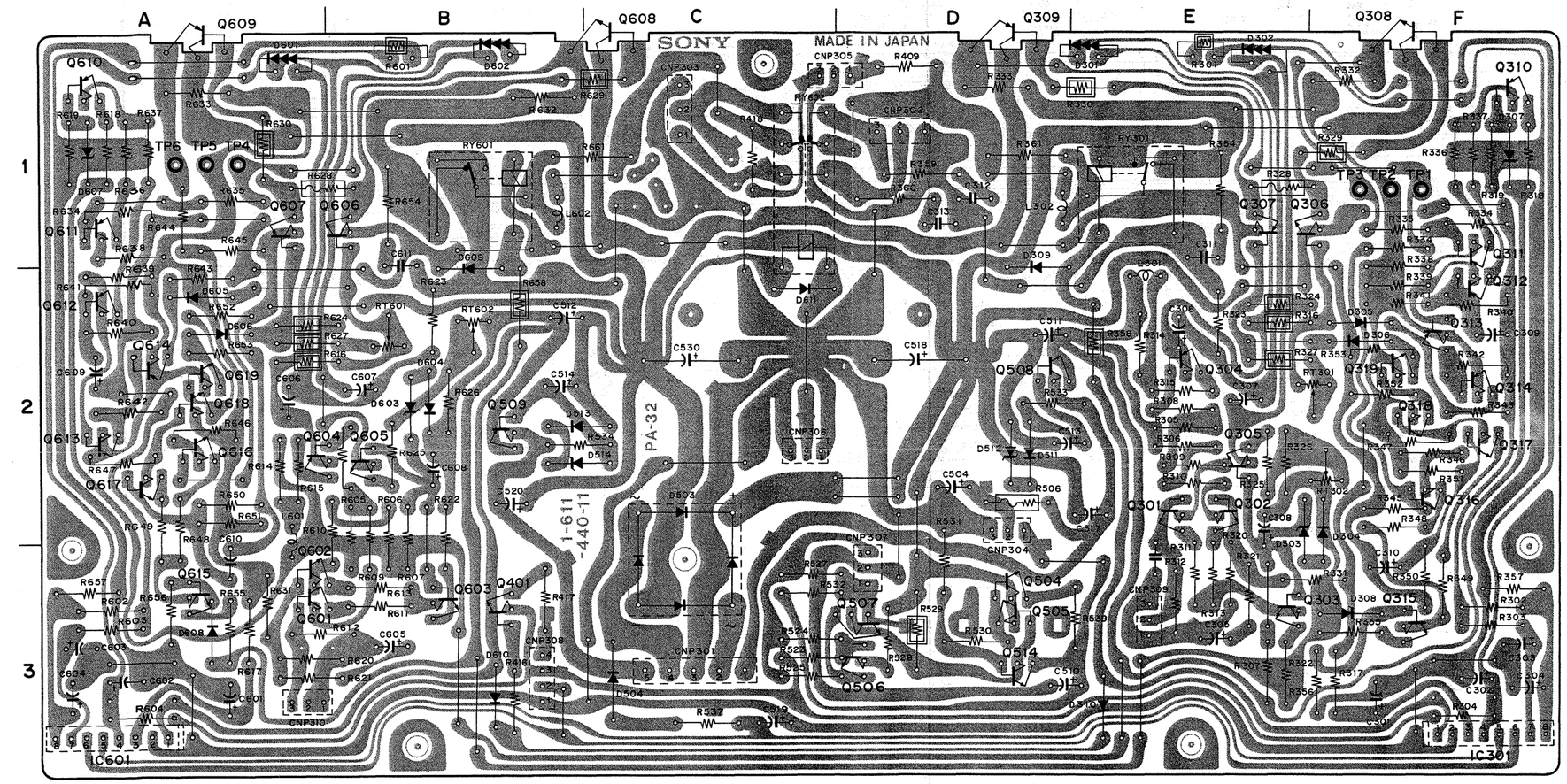


EQ-4
1-611-442-11



LED-7
1-611-447-11

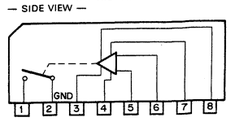
PA-32 (POWER AMP)

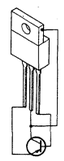


CNP301	C - 3	Q312	F - 2	D301	E - 1
CNP302	D - 1	Q313	F - 2	D302	E - 1
CNP303	C - 1	Q314	F - 2	D303	F - 2
CNP304	D - 2	Q315	F - 3	D304	F - 2
CNP305	C - 1	Q316	F - 2	D305	F - 2
CNP306	C - 2	Q317	F - 2	D306	D - 2
CNP307	D - 3	Q318	F - 2	D306	F - 2
CNP308	B - 3	Q319	F - 2	D307	F - 1
CNP309	E - 3	Q401	B - 3	D308	F - 3
CNP310	A - 3	Q504	D - 3	D310	E - 3
		Q505	D - 3	D503	C - 3
		Q506	D - 3	D504	C - 3
		Q507	D - 3	D511	D - 2
		Q508	D - 2	D512	D - 2
		Q509	B - 2	D513	B - 2
		Q515	D - 3	D514	B - 2
		Q601	A - 1	D601	A - 1
		Q601	A - 3	D602	B - 1
		Q602	A - 3	D603	B - 2
		Q603	B - 3	D604	B - 2
		Q604	A - 2	D605	A - 2
		Q605	B - 2	D606	A - 2
		Q606	B - 1	D606	B - 2
		Q607	A - 1	D607	A - 1
		Q608	C - 1	D608	A - 3
		Q609	A - 1	D610	B - 3
		Q611	A - 1	D611	C - 2
		Q612	A - 2		
		Q613	A - 2	IC301	F - 3
		Q614	A - 2	IC601	A - 3
		Q615	A - 3		
		Q616	A - 2	Q301	E - 2
		Q618	A - 2	Q302	E - 2
		Q619	A - 2	Q303	E - 3
				Q304	E - 2
		RT301	F - 2	Q305	E - 2
		RT302	F - 2	Q306	F - 1
		RT601	B - 2	Q307	E - 1
		RT602	B - 2	Q308	F - 1
				Q309	D - 1
		TP1	F - 1	Q310	F - 1
		TP2	F - 1	Q311	F - 1
		TP3	F - 1		
		TP4	A - 1		
		TP5	A - 1		
		TP6	A - 1		

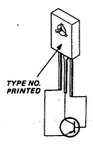
PA-32 –SOLDERING SIDE–
1-611-440-11
PA-A200

HA12002
BIPOLAR MONOLITHIC AMP PROTECTOR
— SIDE VIEW —

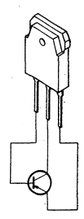



2SA771
(2SA985)

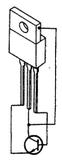
2SA1027

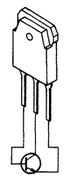


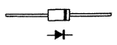
(2SA1142)


(2SA1265)

2SC1345
2SC1775A
2SC1815
(2SD666A)

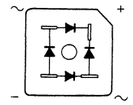

2SC1986
(2SC2275A)


(2SC3182)


10E-2
1S1555
(HZ6A1L)
(HZ6C1)
(HZ12C1)

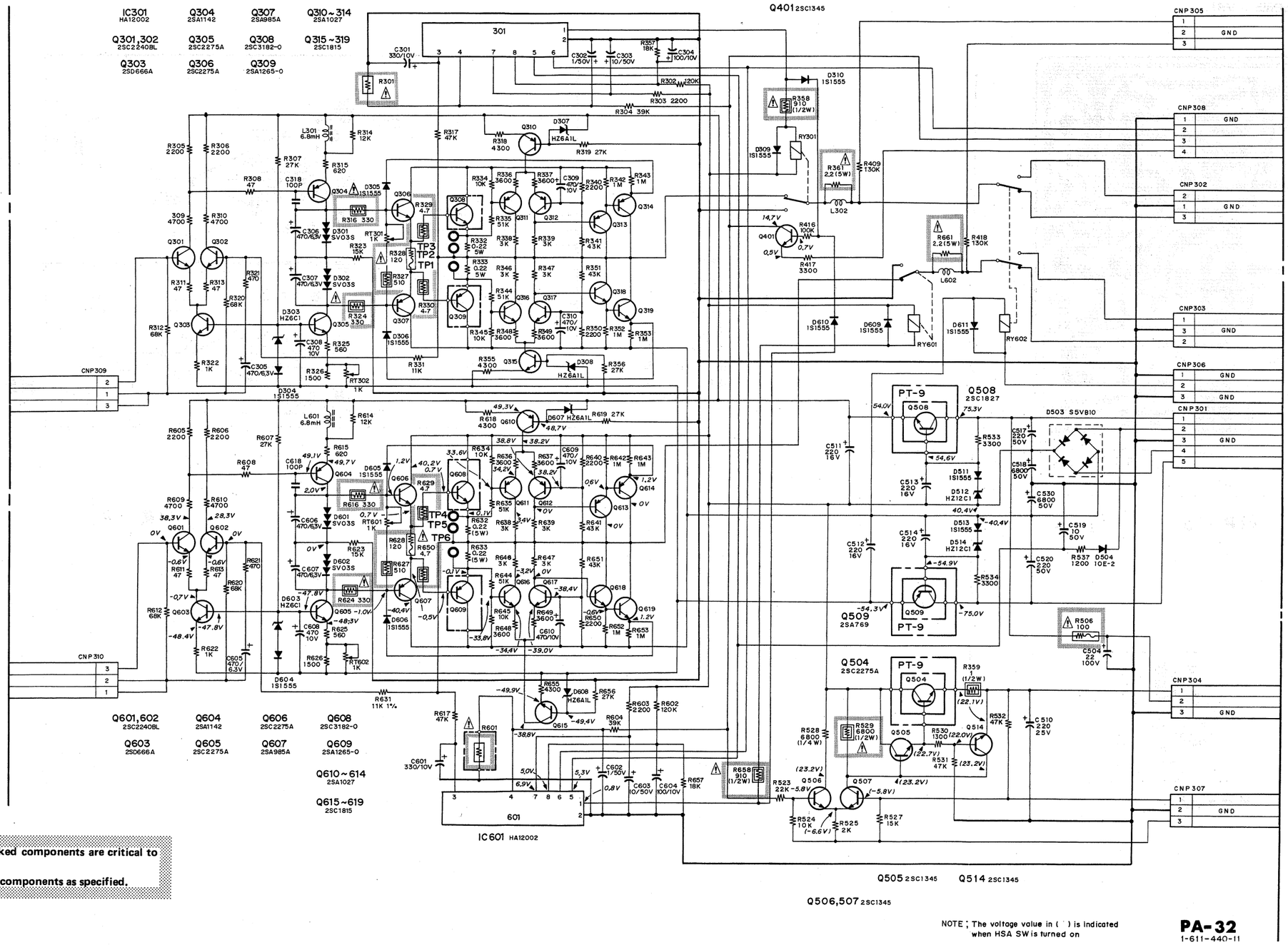
(SV-03S)

BOTTOM VIEW



S5VB10

PA-32 (POWER AMP)



The shaded and ⚠-marked components are critical to safety.
Replace only with same components as specified.

Q505 2SC1345 Q514 2SC1345

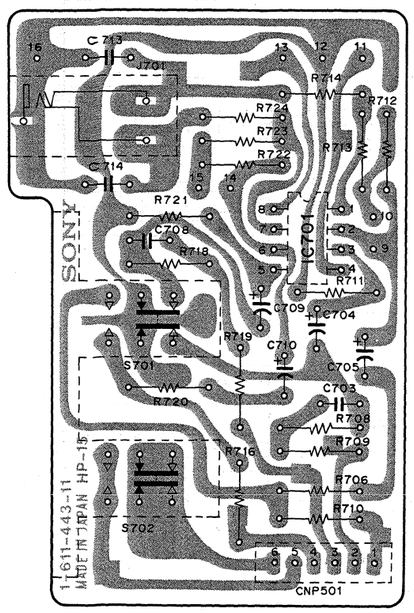
Q506,507 2SC1345

NOTE ; The voltage value in ( ) is indicated when HSA SW is turned on

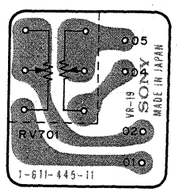
PA-32
1-611-440-11

HP-15, VR-9

HP-15 (HEADPHONE AMP)
VR-9 (HEADPHONE – VR)



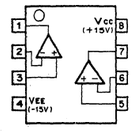
HP-15 –SOLDERING SIDE–
1-611-443-11
PA-A200

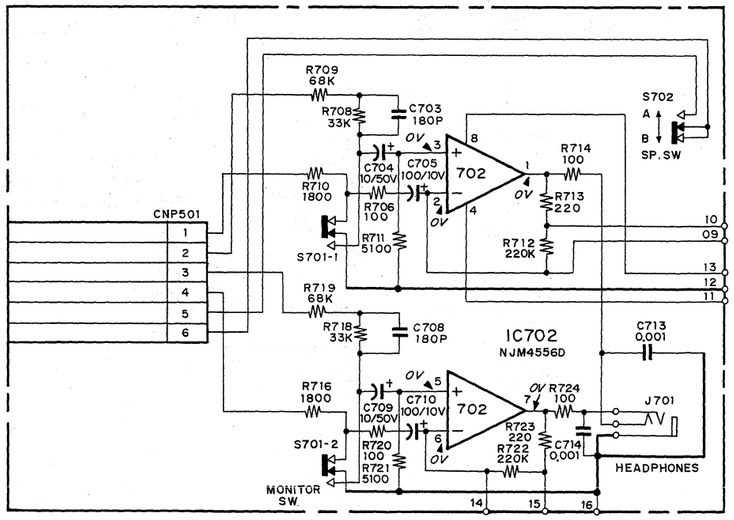


VR-19 –SOLDERING SIDE–
1-611-445-11
PA-A200

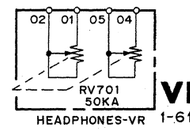
NJM4560D

RC4560
OPERATIONAL AMPLIFIER
— TOP VIEW —



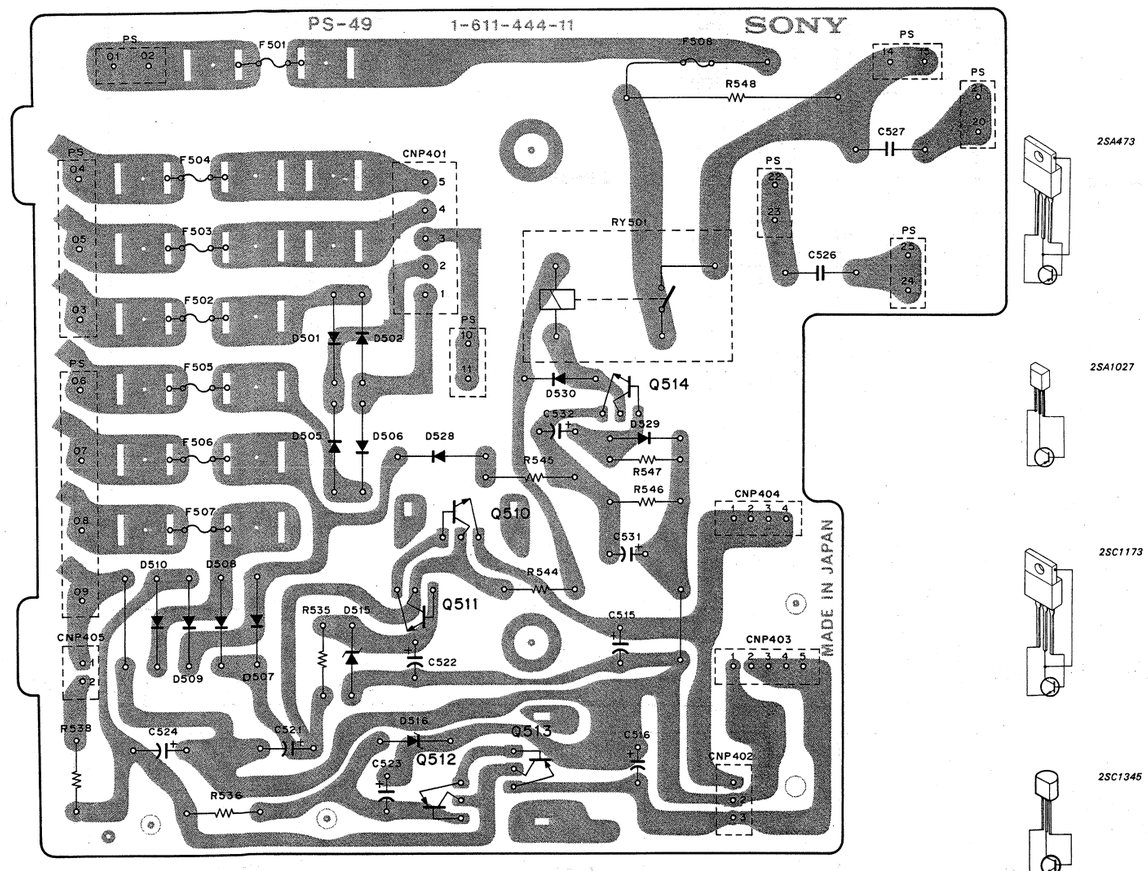


HP-15
1-611-443-11

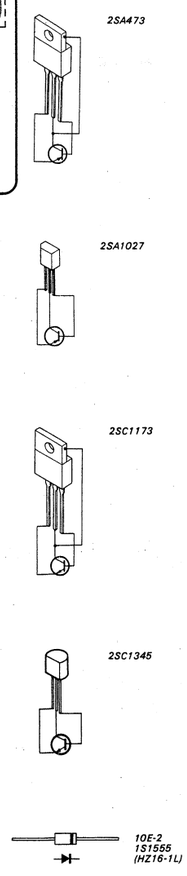


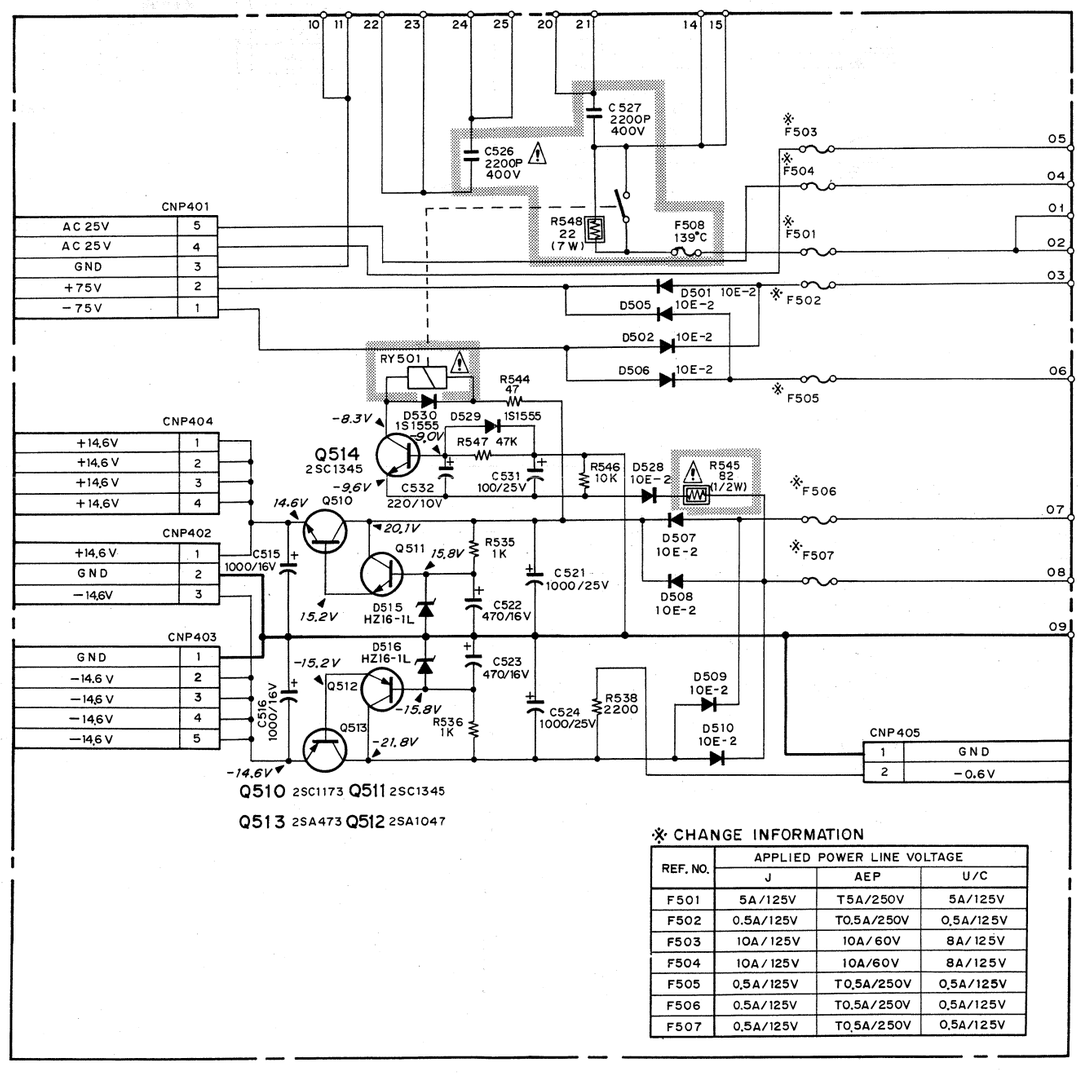
VR-19
1-611-445-11

PS-49 (POWER SU PPLY)



PS-49 –SOLDERING SIDE–
1-611-444-11
PA-A200





※ CHANGE INFORMATION

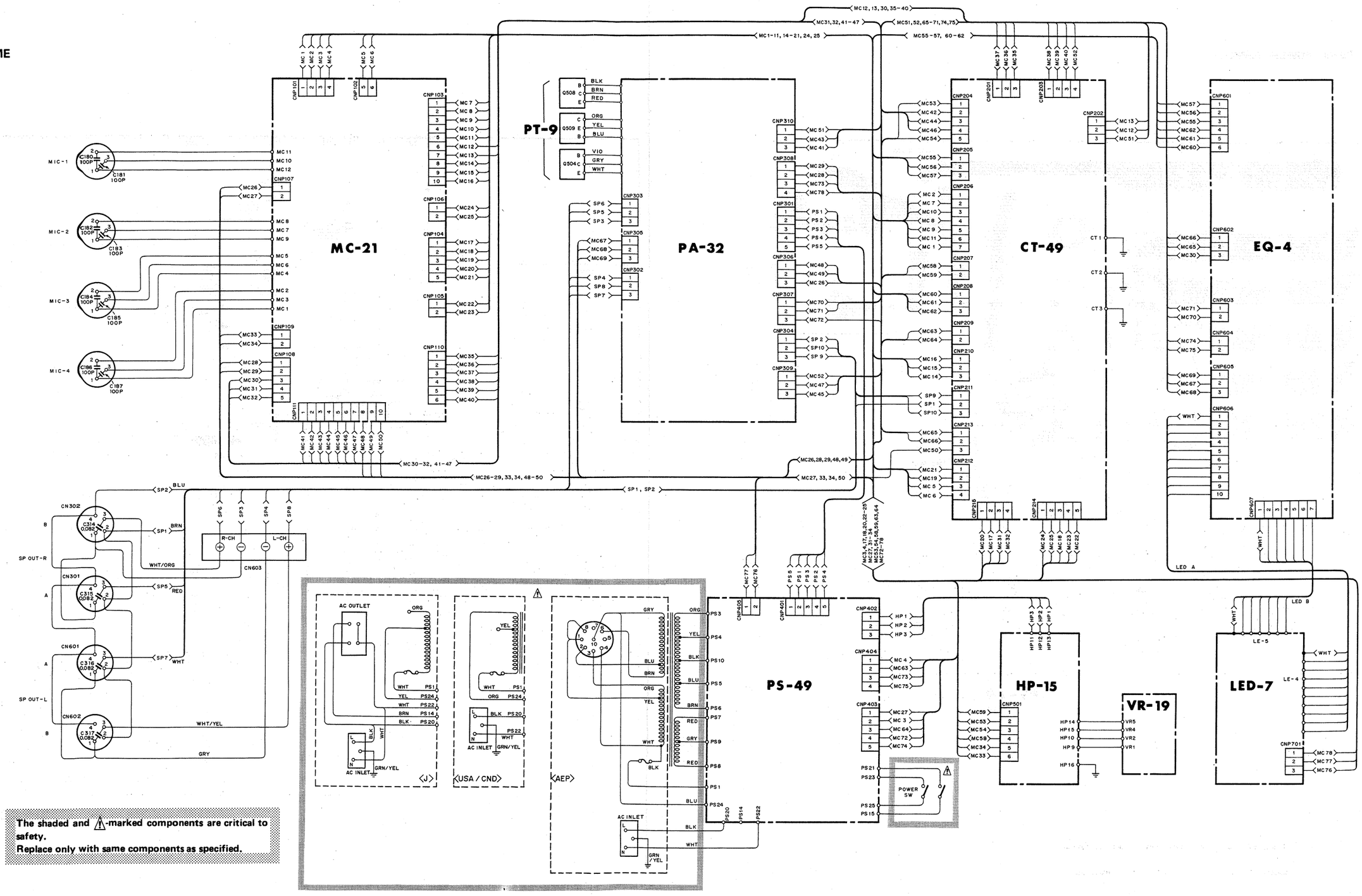
REF. NO.	APPLIED POWER LINE VOLTAGE		
	J	AEP	U/C
F501	5A/125V	T5A/250V	5A/125V
F502	0.5A/125V	T0.5A/250V	0.5A/125V
F503	10A/125V	10A/60V	8A/125V
F504	10A/125V	10A/60V	8A/125V
F505	0.5A/125V	T0.5A/250V	0.5A/125V
F506	0.5A/125V	T0.5A/250V	0.5A/125V
F507	0.5A/125V	T0.5A/250V	0.5A/125V

PS-49
1-611-444-11

The shaded and ⚠-marked components are critical to safety.
Replace only with same components as specified.

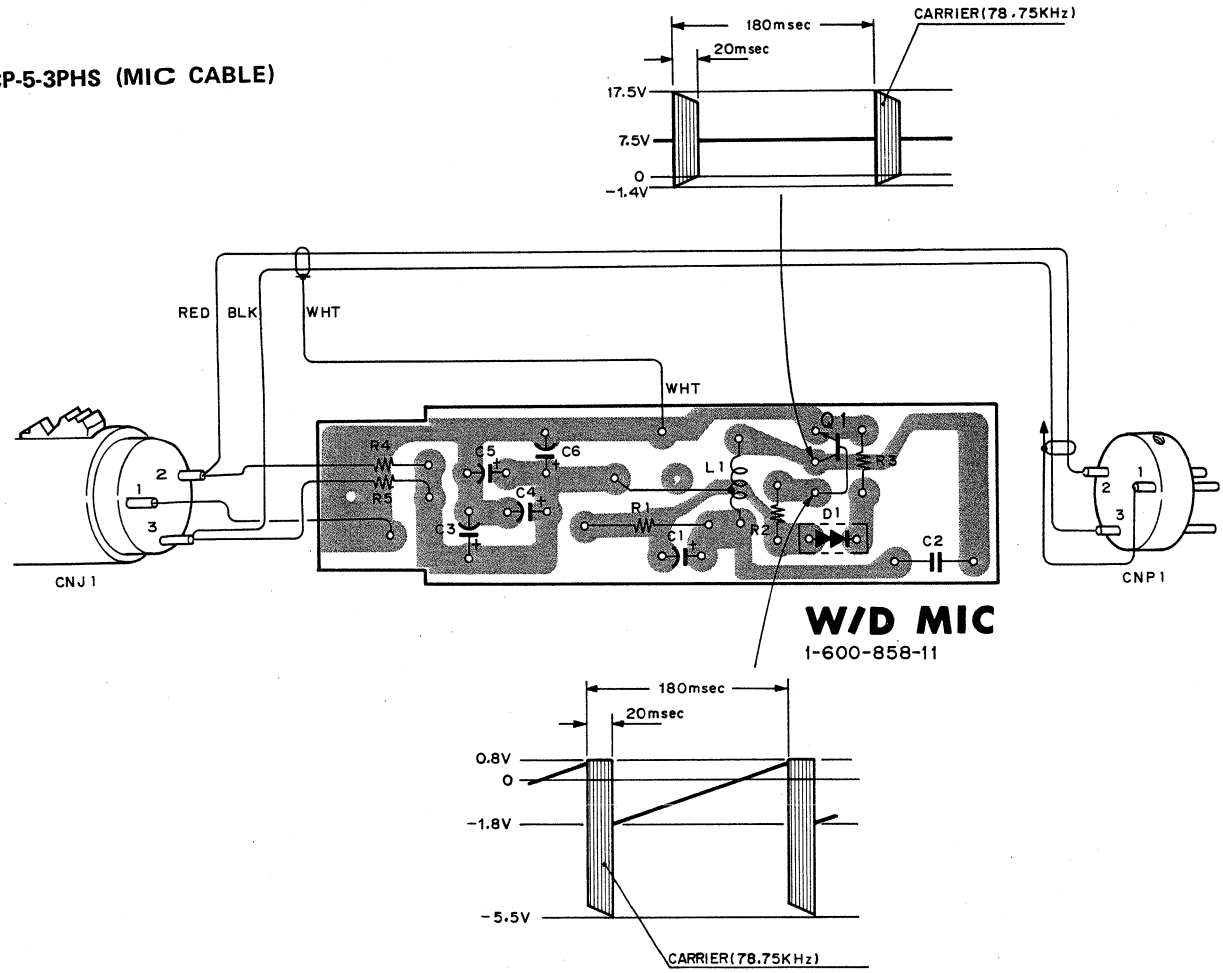
FRAME FRAME

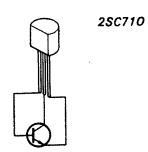
FRAME

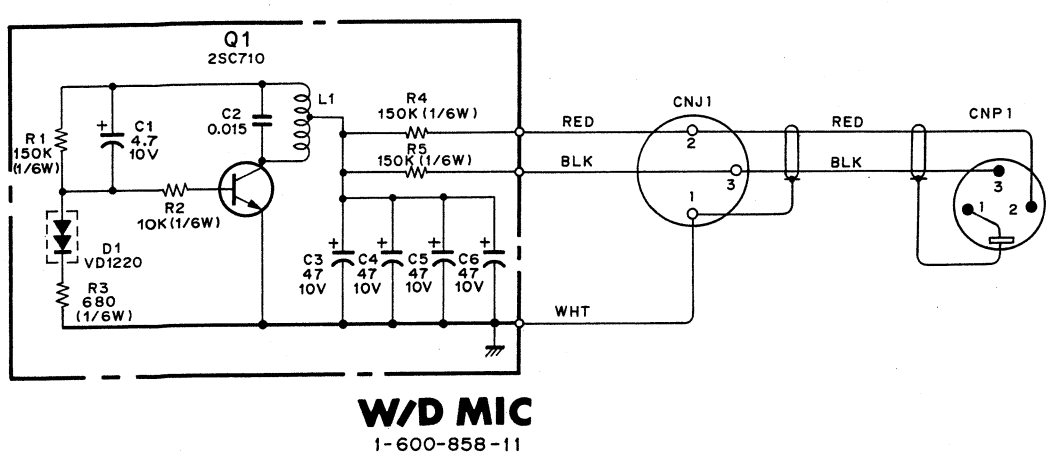


The shaded and ⚠-marked components are critical to safety.
Replace only with same components as specified.

ECP-5-3PHS (MIC CABLE)







SECTION 5
SPARE PARTS

5-1. PARTS INFORMATION

1. Safety Related Component Warning

Components identified by shading marked with ⚠ on the schematic diagrams, exploded views and electrical spare parts list are critical to safe operation. Replace these components with Sony parts whose parts numbers appear as shown in this manual or in service bulletins and service manual supplements published by Sony.

2. Replacement Parts supplied from Sony Parts Center will sometimes have different shape and outside view from the parts which actually in use. This is due to "accommodating the improved parts and/or engineering changes" or "standardization of genuine parts."
   - This manul's exploded views and electrical spare parts lists are indicating the parts numbers of "the standardized genuine parts at present".
   - Regarding engineering parts changes in our engineering dapartment, refer Sony service bulletins and service manual supplements.

3. **Printed Components in Bold-Face type** on the exploded views and electrical spare parts list are normally stocked for replacement purposes. The remaining parts are not normally required for routine service work. Orders for parts not shown in Bold-Face type will be processed, but allow for additional delivery time.

4. Item with no part number and/or no description are not stocked because they are seldom required for routine service.

5. Screws
   - All the screws used in this machine are the TOTSU type unless otherwise noted. The screws are interchangeable with the Phillips type (⊕) and slotted type (⊖) screws.
   - Please order as the following part number when ordering the TOTSU type screws.

SCREWS

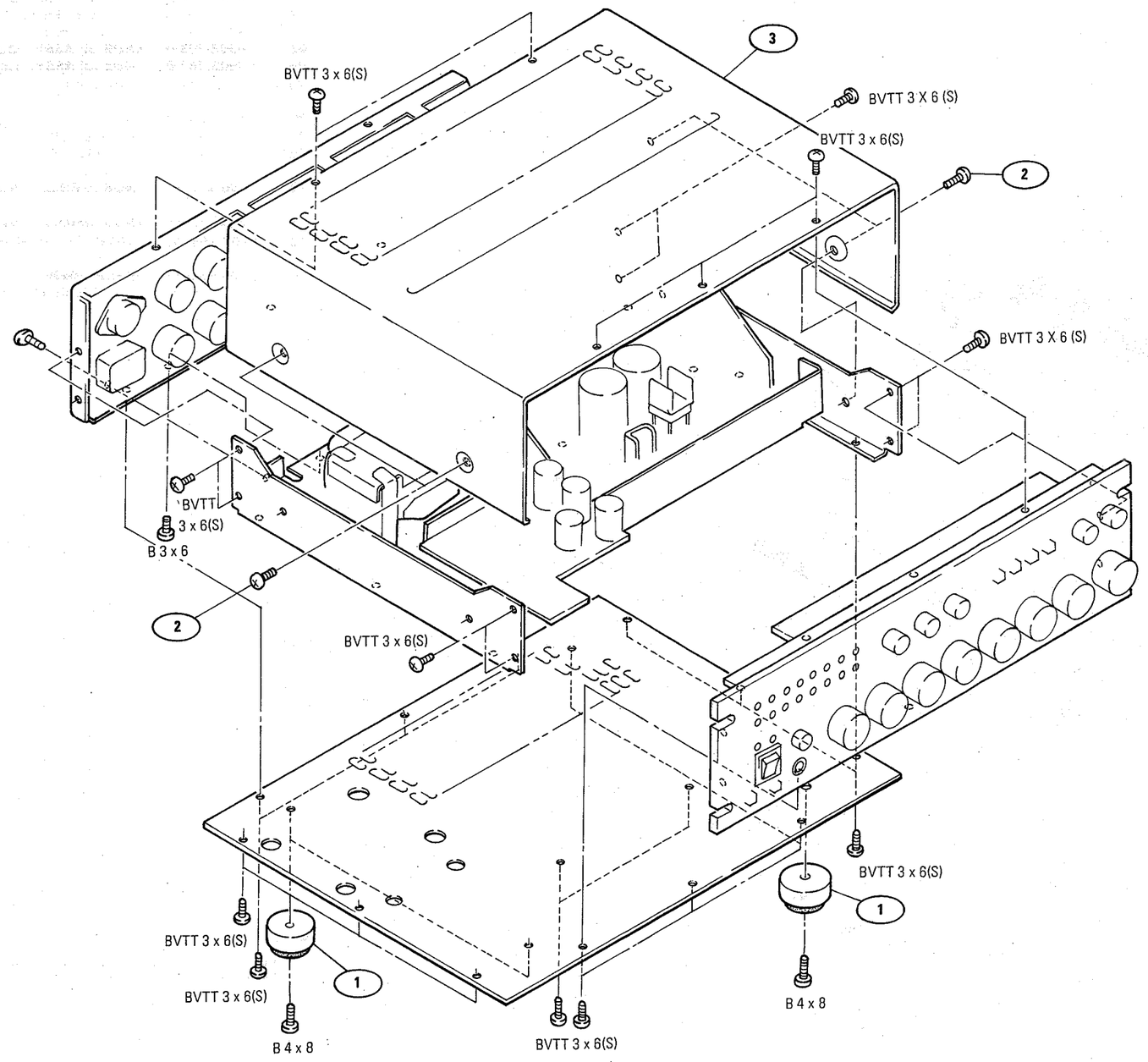
Size	+B (CR-N)	+B (BZN-N)	+BTP (BZN-N) TYPE2 N-S	+BVTP (CZN-N) TYPE2 SUT	+BVTT (CZN-N) (S)	+BVTT (BZN-N) (S)
2 x 8	———	———	———	———	———	———
3 x 6	7-682-547-04	7-682-547-09	———	7-685-645-21	7-685-871-01	7-685-871-09
3 x 8	———	7-682-548-09	———	———	———	———
3 x 10	———	———	7-685-547-19	———	———	7-685-873-09
4 x 8	———	7-682-561-09	———	———	———	———
4 x 10	———	———	———	———	———	———
4 x 40	———	7-682-570-09	———	———	———	———

Size	+P (CR-N) PRECISION	+PS (CZN-N)	+PSW (CZN-N)	+RK (CR-N)
2 x 8	7-627-553-97	———	———	———
3 x 6	———	7-682-647-01	———	———
3 x 8	———	———	———	7-682-348-04
3 x 10	———	———	———	———
4 x 8	———	———	7-682-961-01	———
4 x 10	———	———	———	———
4 x 40	———	———	———	———

HEXAGON NUT

Size	N.
3 mm	7-684-023-04
4 m	7-684-024-04

5-2. EXPLODED VIEW CABINET ASSEMBLY

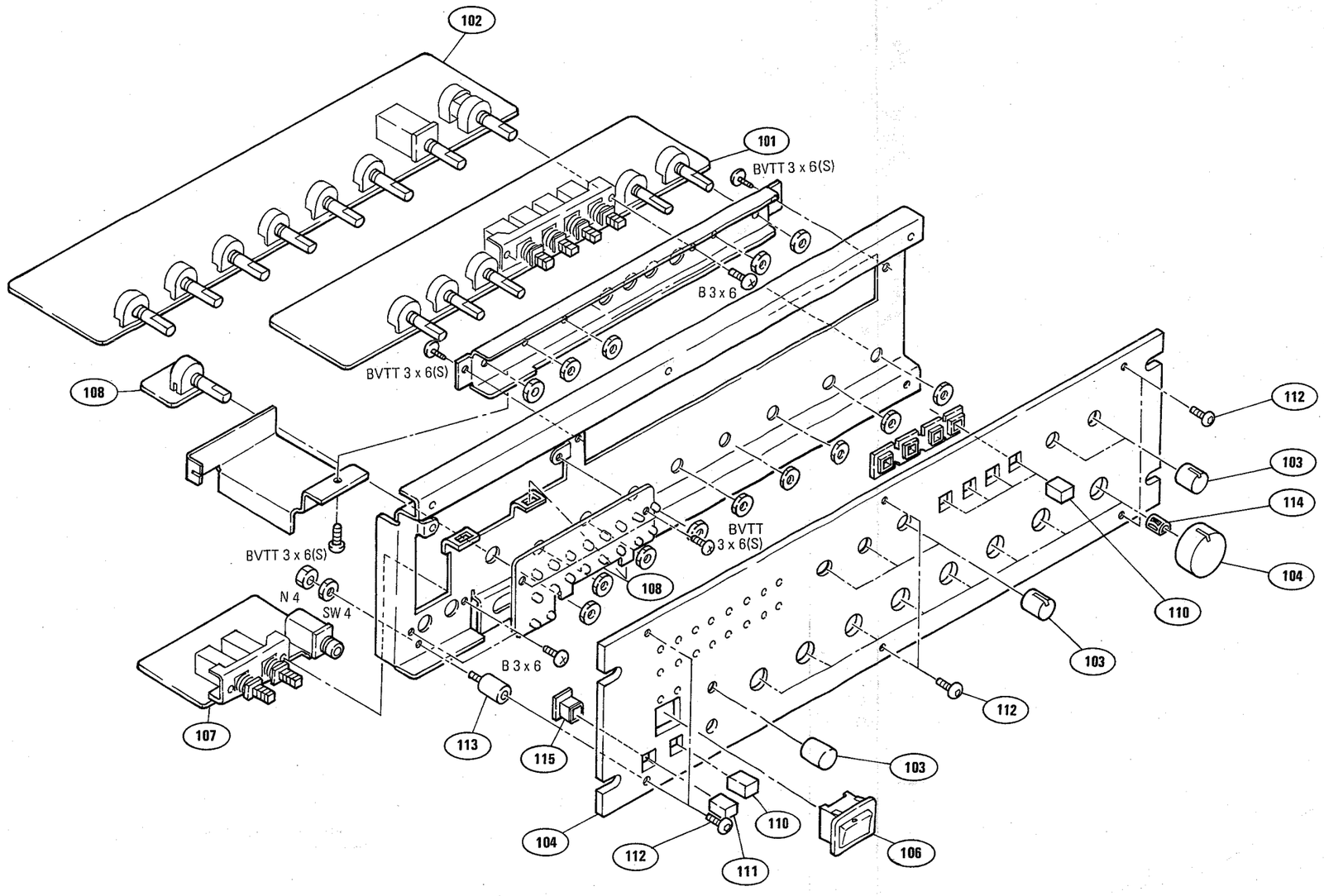


No.	Parts No.	Description
1	**X-4310-310-0**	**FOOT ASSY**
2	**4-847-802-11**	**SCREW, CASE, STOPPER**
3	4-902-730-00	CASE

NOTE:

1. **The shaded and ⚠ -marked components are critical to safety. Replace only with same components as specified.**
2. Parts printed in Bold-Face type are normally stocked for replacement purposes. The remaining parts shown in this manual are not normally required for routine service work. Orders for parts not shown in Bold-Face type will be processed, but allow for additional delivery time.
3. Item with no part number and/or no description are not stocked because they are seldom required for routine service.

FRONT PANEL ASSEMBLY



No.	Parts No.	Description
101	A-4358-124-A	COMPLETE PCB, EQ
102	A-4375-182-A	COMPLETE PCB, C, T (CA, AE)
	A-4375-184-A	COMPLETE PCB, C, T (U)
103	**X-4902-703-0**	**KNOB (A) ASSY, CONTROL**
104	**X-4902-704-0**	**KNOB (B) ASSY, CONTROL**
105	X-4902-705-0	PANEL ASSY
106	1-554-709-11	SWITCH, SEESAW (AC POWER)
107	1-611-443-00	PC BOARD, HP-15
108	1-611-445-00	PC BOARD, VR-19
109	1-611-447-00	PC BOARD, LED-7
110	**2-380-412-01**	**KNOB (SMOLL), PUSH BUTTON**
111	**2-380-412-11**	**KNOB (SMOLL), PUSH BUTTON**
112	**4-882-768-02**	**SCREW, BUTTON HEAD (M4×8)**
113	4-902-711-00	SUPPORT
114	**3-703-466-00**	**SPRING (6600)**
115	4-902-719-00	ESCUTCHEON (B), KNOB

NOTE:

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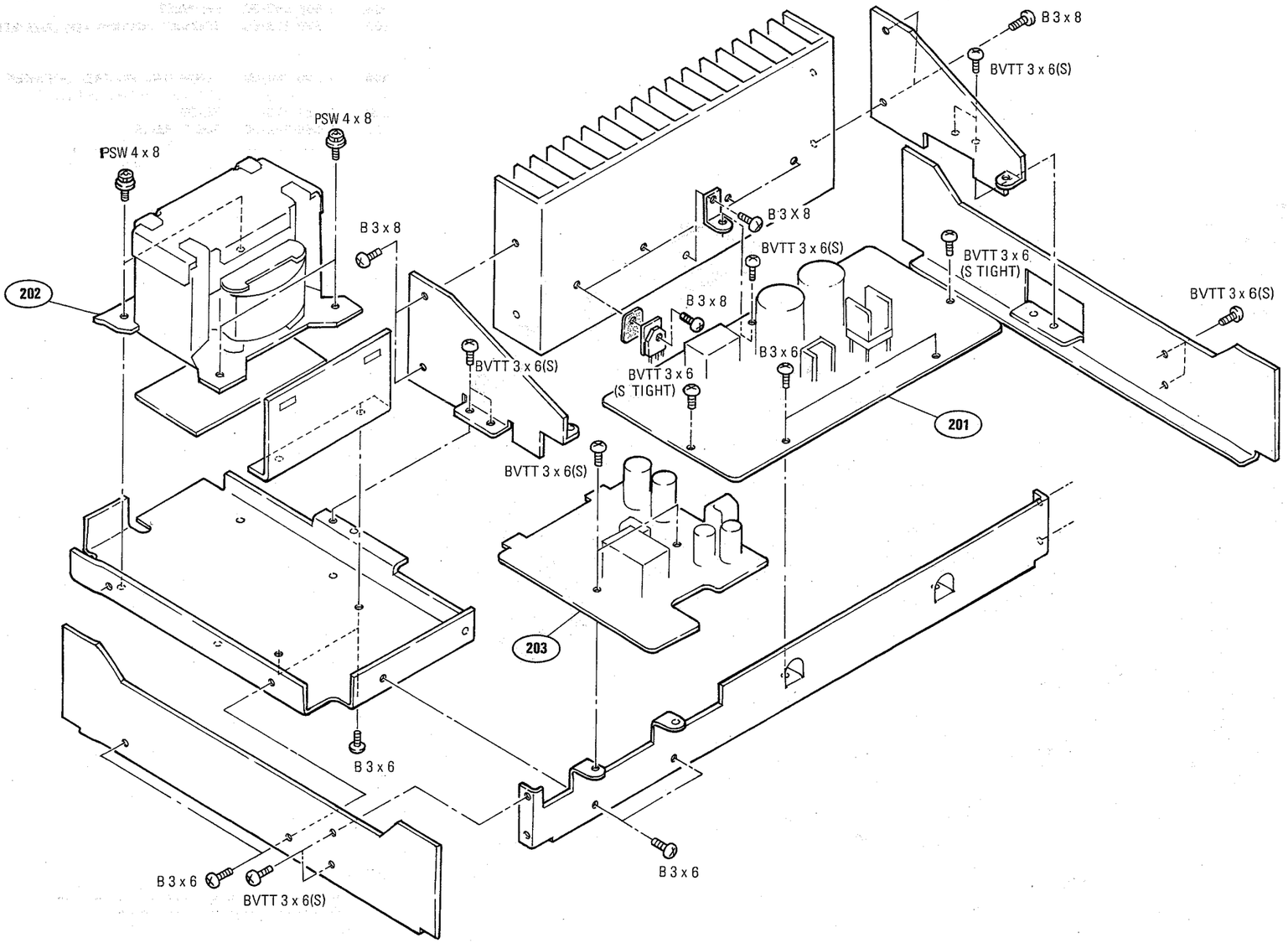
3. Item with no part number and/or no description are not stocked because they are seldom required for routine service.

CHASSIS ASSEMBLY



No.	Parts No.	Description
201	A-4388-368-A	COMPLETE PCB, P.A
202	**1-447-752-11**	**TRANSFORMER, POWER (AE)**
203	1-611-444-00	**TRANSFORMER, POWER (U, CA)**
204	**4-871-906-00**	**SHEET, INSULATING**

NOTE:

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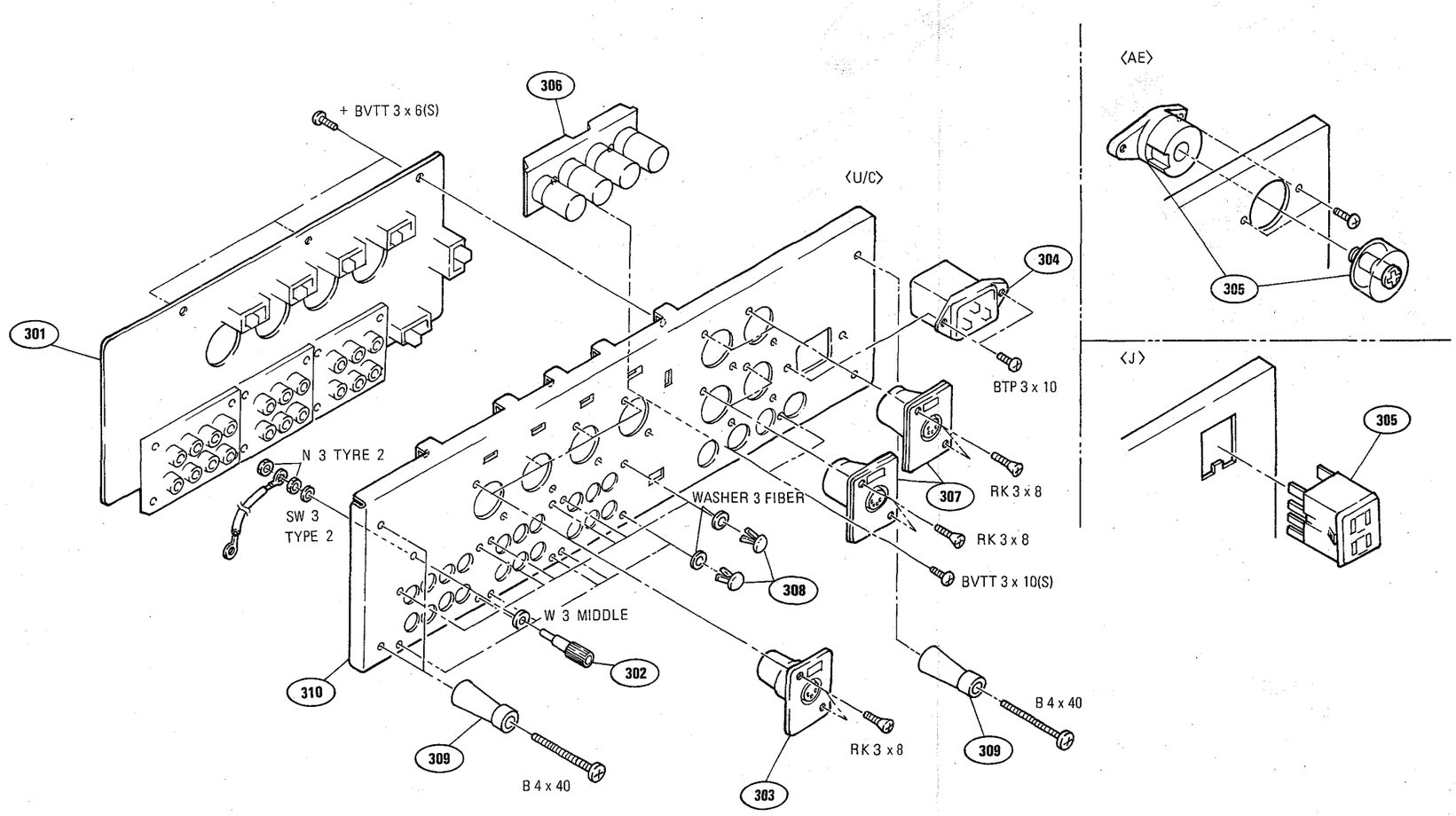
3. Item with no part number and/or no description are not stocked because they are seldom required for routine service.

REAR PANEL ASSEMBLY

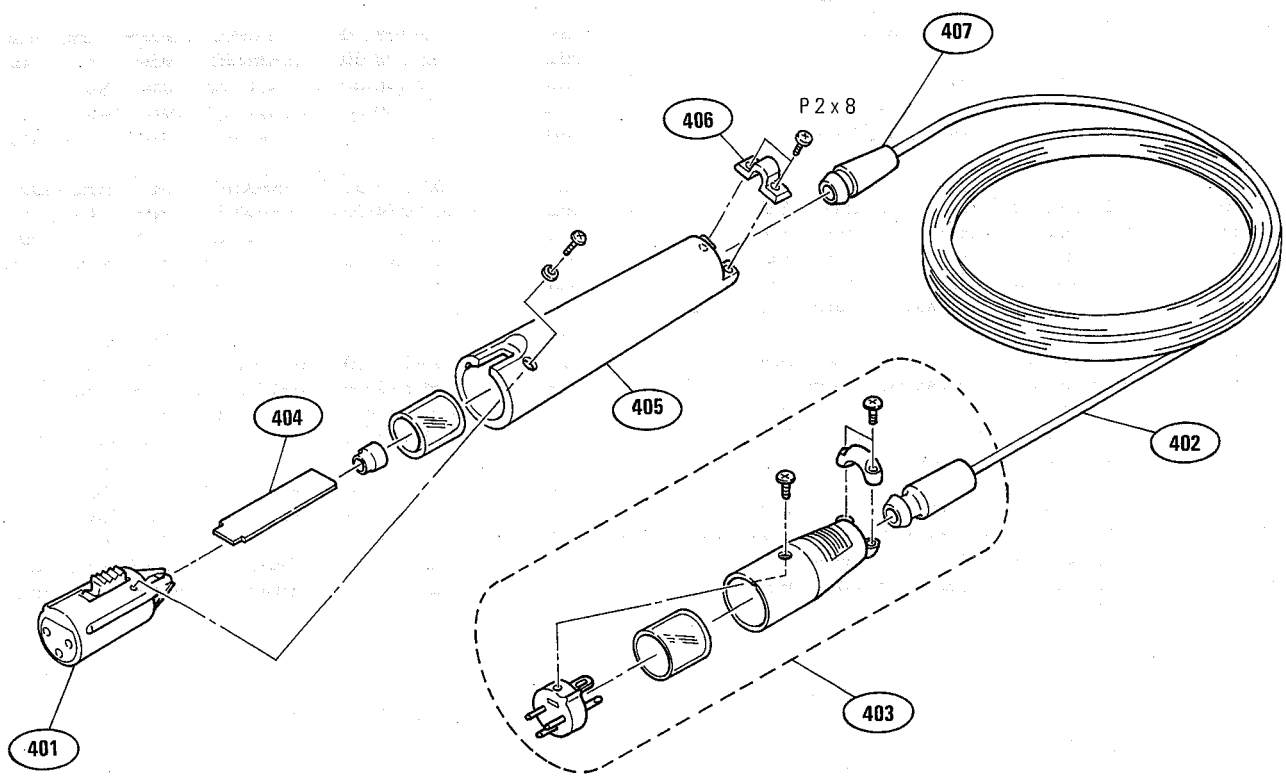


No.	Parts No.	Description
301	A-4363-038-A	COMPLETE PCB, M.C
302	**X-4854-207-0**	**TERMINAL ASSY, GROUND**
303	**1-509-184-00**	**CONNECTOR (RECEPTACLE) 3P (CA)**
	1-562-299-00	**CONNECTOR (RECEPTACLE) (U, AE)**
304	**1-509-547-00**	**3P INLET**
305	**1-526-572-00**	**SOCKET, POWER VOLTAGE SELECT (AE)**
306	**1-536-767-00**	**TERMINAL BOARD, SPEAKER**
307	1-562-395-00	CONNECTOR (RECEPTACLE)
308	**3-531-576-21**	**RIVET**
309	**3-668-924-00**	**FOOT, REAR**
310	4-902-728-00	PLATE (B), JACK (AE)
	4-902-729-00	PLATE (C), JACK (U, CA)

NOTE:

1. **The shaded and ⚠ -marked components are critical to safety. Replace only with same components as specified.**
2. Parts printed in Bold-Face type are normally stocked for replacement purposes. The remaining parts shown in this manual are not normally required for routine service work. Orders for parts not shown in Bold-Face type will be processed, but allow for additional delivery time.
3. Item with no part number and/or no description are not stocked because they are seldom required for routine service.

MIC CABLE (ECP-5-3PHS)



No.	Parts No.	Description
401	**1-508-199-11**	**SOCKET**
402	**1-534-161-00**	**MIC CABLE**
403	**1-564-388-**	**PLUG, CONNECTOR**
404	1-600-858-00	PC BOARD, W/D MIC
405	**2-528-201-00**	**ADAPTER (B), MICROPHONE**
406	**2-528-202-00**	**ADAPTER (A), MICROPHONE**
407	4-902-735-01	BUSHING, INSULATING

NOTE:

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3. Item with no part number and/or no description are not stocked because they are seldom required for routine service.

5-3. ELECTRICAL PARTS LIST

Ref. No.	Parts No.	Description
CT-49 BOARD		
	A-4375-182-A	COMPLETE PCB, CT-49 (CA, AE, J)
	A-4375-184-A	COMPLETE PCB, CT-49 (U)
	1-560-061-00	PIN, CONNECTOR 3P
	1-564-224-00	PIN, CONNECTOR 3P
	1-564-225-00	PIN, CONNECTOR 4P
	1-564-226-00	PIN, CONNECTOR 5P
	1-564-400-11	PIN, CONNECTOR 2P
	1-564-401-11	PIN, CONNECTOR 7P
C110	1-123-356-00	ELECT 10 20% 25V
C121	1-123-356-00	ELECT 10 20% 25V
C131	1-123-356-00	ELECT 10 20% 25V
C141	1-123-356-00	ELECT 10 20% 25V
C143	1-102-108-00	CERAMIC 150PF 10% 50V
C144	1-123-369-00	ELECT 4.7 20% 50V
C145	1-102-108-00	CERAMIC 150PF 10% 50V
C146	1-123-332-00	ELECT 47 20% 25V
C147	1-123-332-00	ELECT 47 20% 25V
C148	1-102-108-00	CERAMIC 150PF 10% 50V
C149	1-123-369-00	ELECT 4.7 20% 50V
C150	1-102-108-00	CERAMIC 150PF 10% 50V
C151	1-123-332-00	ELECT 47 20% 25V
C152	1-123-332-00	ELECT 47 20% 25V
C168	1-102-074-00	CERAMIC 0.001 10% 50V
C202	1-123-356-00	ELECT 10 20% 25V
C203	1-102-802-00	CERAMIC 24PF 5% 50V
C204	1-123-356-00	ELECT 10 20% 25V
C216	1-123-356-00	ELECT 10 20% 25V
C218	1-123-330-00	ELECT 22 20% 25V
C220	1-123-369-00	ELECT 4.7 20% 50V
C221	1-123-332-00	ELECT 47 20% 16V
C230	1-123-369-00	ELECT 4.7 20% 50V
C231	1-123-332-00	ELECT 47 20% 16V
C240	1-102-108-00	CERAMIC 150PF 10% 50V
C241	1-123-369-00	ELECT 4.7 20% 50V
C242	1-102-108-00	CERAMIC 150PF 10% 50V
C243	1-123-332-00	ELECT 47 20% 25V
C244	1-123-332-00	ELECT 47 20% 25V
C245	1-123-369-00	ELECT 4.7 20% 50V
C246	1-102-108-00	CERAMIC 150PF 10% 50V
C247	1-102-108-00	CERAMIC 150PF 10% 50V
C248	1-123-332-00	ELECT 47 20% 25V
C249	1-123-332-00	ELECT 47 20% 25V
C250	1-123-369-00	ELECT 4.7 20% 50V
C251	1-102-108-00	CERAMIC 150PF 10% 50V
C252	1-102-108-00	CERAMIC 150PF 10% 50V
C253	1-123-330-00	ELECT 22 20% 25V
C254	1-123-330-00	ELECT 22 20% 25V
C255	1-123-369-00	ELECT 4.7 20% 50V
C256	1-102-108-00	CERAMIC 150PF 10% 50V
C257	1-102-108-00	CERAMIC 150PF 10% 50V
C258	1-123-330-00	ELECT 22 20% 25V
C259	1-123-330-00	ELECT 22 20% 25V
C260	1-102-106-00	CERAMIC 100PF 10% 50V
C261	1-102-074-00	CERAMIC 0.001 10% 50V
C262	1-102-074-00	CERAMIC 0.001 10% 50V
C263	1-102-074-00	CERAMIC 0.001 10% 50V
C502	1-123-360-00	ELECT 100 20% 50V
C503	1-123-384-00	ELECT 10 20% 100V
C506	1-123-332-00	ELECT 47 20% 16V
C507	1-108-579-00	MYLAR 0.01 5% 50V
C508	1-108-555-00	MYLAR 0.001 5% 50V
C525	1-130-640-00	FILM 0.47 5% 50V
C701	1-123-369-00	ELECT 4.7 20% 50V
C702	1-123-332-00	ELECT 47 20% 16V
C706	1-123-369-00	ELECT 4.7 20% 50V
C707	1-123-332-00	ELECT 47 20% 16V
C711	1-102-108-00	CERAMIC 150PF 10% 50V
C712	1-102-108-00	CERAMIC 150PF 10% 50V
D518	8-719-815-55	1S1555
D519	8-719-815-55	1S1555
D520	8-719-815-55	1S1555
D521	8-719-815-55	1S1555
D522	8-719-815-55	1S1555
D523	8-719-815-55	1S1555
D524	8-719-907-21	HZ12C1
D525	8-719-910-61	HZ6A1L
D527	8-719-815-55	1S1555
IC201	8-759-145-58	μPC4558C
IC203	8-759-145-58	μPC4558C
IC501	8-759-745-60	NJM4560D
IC701	8-759-145-58	μPC4558C

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Ref. No.	Parts No.	Description
Q109	8-729-377-59	2SC1775-F
Q110	8-729-387-28	2SA872-E
Q111	8-729-377-59	2SC1775-F
Q112	8-729-387-28	2SA872-E
Q205	8-729-377-59	2SC1775-F
Q206	8-729-387-28	2SA872-E
Q207	8-729-377-59	2SC1775-F
Q208	8-729-387-28	2SA872-E
Q209	8-729-377-59	2SC1775-F
Q210	8-729-387-28	2SA872-E
Q211	8-729-377-59	2SC1775-F
Q212	8-729-387-28	2SA872-E
Q502	8-729-168-22	2SC2682-Q
Q503	8-729-300-62	2SD666A-C
R162	1-246-521-00	CARBON 100K 5% 1/4W
R163	1-246-521-00	CARBON 100K 5% 1/4W
R164	1-246-497-00	CARBON 10K 5% 1/4W
R165	1-246-497-00	CARBON 10K 5% 1/4W
R166	1-246-521-00	CARBON 100K 5% 1/4W
R167	1-246-521-00	CARBON 100K 5% 1/4W
R168	1-246-497-00	CARBON 10K 5% 1/4W
R169	1-246-497-00	CARBON 10K 5% 1/4W
R201	1-246-512-00	CARBON 43K 5% 1/4W
R202	1-246-517-00	CARBON 68K 5% 1/4W
R204	1-246-531-00	CARBON 270K 5% 1/4W
R205	1-246-521-00	CARBON 100K 5% 1/4W
R210	1-246-517-00	CARBON 68K 5% 1/4W
R223	1-246-517-00	CARBON 68K 5% 1/4W
R225	1-246-517-00	CARBON 68K 5% 1/4W
R227	1-246-537-00	CARBON 470K 5% 1/4W
R228	1-246-521-00	CARBON 100K 5% 1/4W
R229	1-246-449-00	CARBON 100 5% 1/4W
R230	1-246-512-00	CARBON 43K 5% 1/4W
R231	1-246-525-00	CARBON 150K 5% 1/4W
R233	1-246-521-00	CARBON 100K 5% 1/4W
R245	1-246-466-00	CARBON 510 5% 1/4W
R246	1-246-512-00	CARBON 43K 5% 1/4W
R247	1-246-525-00	CARBON 150K 5% 1/4W
R248	1-246-521-00	CARBON 100K 5% 1/4W
R260	1-246-466-00	CARBON 510 5% 1/4W
R262	1-246-497-00	CARBON 10K 5% 1/4W
R263	1-246-525-00	CARBON 150K 5% 1/4W
R264	1-246-521-00	CARBON 100K 5% 1/4W
R265	1-246-497-00	CARBON 10K 5% 1/4W

Ref. No.	Parts No.	Description
R266	1-246-497-00	CARBON 10K 5% 1/4W
R267	1-246-525-00	CARBON 150K 5% 1/4W
R268	1-246-521-00	CARBON 100K 5% 1/4W
R269	1-246-497-00	CARBON 10K 5% 1/4W
R270	1-246-535-00	CARBON 390K 5% 1/4W
R271	1-246-535-00	CARBON 390K 5% 1/4W
R272	1-246-535-00	CARBON 390K 5% 1/4W
R273	1-246-535-00	CARBON 390K 5% 1/4W
R274	1-246-497-00	CARBON 10K 5% 1/4W
R275	1-246-521-00	CARBON 100K 5% 1/4W
R276	1-246-497-00	CARBON 10K 5% 1/4W
R279	1-246-497-00	CARBON 10K 5% 1/4W
R280	1-246-521-00	CARBON 100K 5% 1/4W
R281	1-246-497-00	CARBON 10K 5% 1/4W
R284	1-246-497-00	CARBON 10K 5% 1/4W
R285	1-246-497-00	CARBON 10K 5% 1/4W
R286	1-246-521-00	CARBON 100K 5% 1/4W
R287	1-246-521-00	CARBON 100K 5% 1/4W
R290	1-246-512-00	CARBON 43K 5% 1/4W
R291	1-246-503-00	CARBON 18K 5% 1/4W
R504	1-246-483-00	CARBON 2.7K 5% 1/4W
⚠R505	1-217-411-00	FUSIBLE 1K 5% 1/4W (NONFLAMMABLE)
R509	1-246-481-00	CARBON 2.2K 5% 1/4W
R510	1-246-495-00	CARBON 8.2K 5% 1/4W
R511	1-246-495-00	CARBON 8.2K 5% 1/4W
R512	1-246-495-00	CARBON 8.2K 5% 1/4W
R513	1-246-495-00	CARBON 8.2K 5% 1/4W
R514	1-246-528-00	CARBON 200K 5% 1/4W
R515	1-246-525-00	CARBON 150K 5% 1/4W
R517	1-246-483-00	CARBON 2.7K 5% 1/4W
R518	1-246-491-00	CARBON 5.6K 5% 1/4W
R519	1-246-518-00	CARBON 75K 5% 1/4W
R520	1-246-506-00	CARBON 24K 5% 1/4W
R521	1-246-505-00	CARBON 22K 5% 1/4W
R522	1-246-505-00	CARBON 22K 5% 1/4W
R540	1-246-537-00	CARBON 470K 5% 1/4W
R541	1-246-501-00	CARBON 15K 5% 1/4W
R542	1-246-449-00	CARBON 100 5% 1/4W
R543	1-246-494-00	CARBON 7.5K 5% 1/4W
R701	1-246-512-00	CARBON 43K 5% 1/4W
R702	1-246-512-00	CARBON 43K 5% 1/4W
R703	1-246-512-00	CARBON 43K 5% 1/4W
R704	1-246-512-00	CARBON 43K 5% 1/4W
R705	1-246-506-00	CARBON 24K 5% 1/4W
R707	1-246-521-00	CARBON 100K 5% 1/4W
R715	1-246-506-00	CARBON 24K 5% 1/4W
R717	1-246-521-00	CARBON 100K 5% 1/4W

NOTE:

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CT-49, EQ-4

Ref. No.	Parts No.	Description
RV201	1-230-309-00	RES, VAR, CARBON 20K/20K
RV202	1-230-309-00	RES, VAR, CARBON 20K/20K
RV203	1-230-309-00	RES, VAR, CARBON 20K/20K
RV204	1-230-309-00	RES, VAR, CARBON 20K/20K
RV205	1-230-311-00	RES, VAR, CARBON 20K×4
RV206	1-230-309-00	RES, VAR, CARBON 20K/20K
RV207	1-230-309-00	RES, VAR, CARBON 20K/20K
S205	1-554-688-00	SWITCH, ROTARY

EQ-4 BOARD

	A-4358-124-A	COMPLETE PCB, EQ-4
	1-508-809-00	BASE POST (14MM) 2P
	1-564-224-00	PIN, CONNECTOR 3P
	1-564-227-00	PIN, CONNECTOR 6P
	1-564-229-00	PIN, CONNECTOR 10P
	1-564-400-11	PIN, CONNECTOR 2P
	1-564-401-11	PIN, CONNECTOR 7P
C205	1-123-330-00	ELECT 22 20% 16V
C206	1-123-330-00	ELECT 22 20% 16V
C207	1-102-115-00	CERAMIC 560PF 10% 50V
C208	1-123-322-00	ELECT 330 20% 16V
C209	1-123-322-00	ELECT 330 20% 16V
C210	1-130-640-00	FILM 0.47 5% 50V
C211	1-108-569-00	MYLAR 0.0039 5% 50V
C212	1-130-627-00	FILM 0.039 5% 50V
C213	1-107-097-00	MICA 330PF 5% 50V
C214	1-130-622-00	FILM 0.015 5% 50V
C215	1-107-088-00	MICA 130PF 5% 50V
C219	1-123-332-00	ELECT 47 20% 50V
C222	1-123-369-00	ELECT 4.7 20% 50V
C223	1-108-579-00	MYLAR 0.01 5% 50V
C224	1-108-579-00	MYLAR 0.01 5% 50V

Ref. No.	Parts No.	Description
C225	1-108-557-00	MYLAR 0.0012 5% 50V
C226	1-123-330-00	ELECT 22 20% 25V
C228	1-102-962-00	CERAMIC 30PF 5% 50V
C229	1-123-330-00	ELECT 22 20% 25V
C232	1-123-369-00	ELECT 4.7 20% 50V
C233	1-108-579-00	MYLAR 0.01 5% 50V
C234	1-108-579-00	MYLAR 0.01 5% 50V
C235	1-108-557-00	MYLAR 0.0012 5% 50V
C236	1-123-330-00	ELECT 22 20% 25V
C238	1-102-962-00	CERAMIC 30PF 5% 50V
C239	1-123-330-00	ELECT 22 20% 25V
C401	1-123-380-00	ELECT 1 20% 50V
C402	1-123-356-00	ELECT 10 20% 50V
C403	1-123-380-00	ELECT 1 20% 50V
C404	1-123-356-00	ELECT 10 20% 50V
C405	1-123-484-00	ELECT 100 20% 16V
C801	1-123-355-00	ELECT 4.7 20% 50V
C802	1-108-557-00	MYLAR 0.0012 5% 50V
C803	1-108-557-00	MYLAR 0.0012 5% 50V
C804	1-102-108-00	CERAMIC 150PF 10% 50V
C805	1-123-330-00	ELECT 22 20% 16V
C806	1-123-379-00	ELECT 0.47 20% 50V
C807	1-130-632-00	FILM 0.1 5% 50V
C808	1-130-622-00	FILM 0.015 5% 50V
C809	1-123-380-00	ELECT 1 20% 50V
C810	1-123-380-00	ELECT 1 20% 50V
C811	1-123-380-00	ELECT 1 20% 50V
C812	1-123-369-00	ELECT 4.7 20% 50V
C813	1-108-555-00	MYLAR 0.001 5% 50V
C814	1-123-356-00	ELECT 10 20% 50V
D401	8-719-815-55	1S1555
D801	8-719-022-21	1T22A
D802	8-719-022-21	1T22A
D803	8-719-815-55	1S1555
D804	8-719-815-55	1S1555
D805	8-719-815-55	1S1555
D806	8-719-815-55	1S1555
D807	8-719-815-55	1S1555
D809	8-719-815-55	1S1555
IC202	8-759-145-58	μPC4558C
IC204	8-759-145-58	μPC4558C
IC205	8-759-745-60	NJM4560D
IC401	8-759-800-74	LB1419
IC402	8-759-800-74	LB1419

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Ref. No.	Parts No.	Description
IC801	8-759-145-58	μPC4558C
IC802	8-759-145-58	μPC4558C
IC803	8-759-145-58	μPC4558C
IC804	8-759-745-60	NJM4560D
Q201	8-729-307-58	2SC1775A
Q202	8-729-307-58	2SC1775A
Q203	8-769-200-20	2SK107-2
Q204	8-769-200-20	2SK107-2
Q402	8-729-387-28	2SA872-E
Q403	8-729-387-28	2SA872-E
Q801	8-729-334-58	2SC1345-E
Q802	8-729-334-58	2SC1345-E
Q803	8-729-334-58	2SC1345-E
Q804	8-729-334-58	2SC1345-E
Q805	8-769-200-20	2SK107-2
R206	1-246-521-00	CARBON 100K 5% 1/4W
R207	1-246-492-00	CARBON 6.2K 5% 1/4W
R208	1-246-492-00	CARBON 6.2K 5% 1/4W
R209	1-246-457-00	CARBON 220 5% 1/4W
R212	1-246-521-00	CARBON 100K 5% 1/4W
R213	1-246-521-00	CARBON 100K 5% 1/4W
R214	1-246-479-00	CARBON 1.8K 5% 1/4W
R215	1-246-527-00	CARBON 180K 5% 1/4W
R216	1-246-475-00	CARBON 1.2K 5% 1/4W
R217	1-246-542-00	CARBON 750K 5% 1/4W
R218	1-246-491-00	CARBON 5.6K 5% 1/4W
R219	1-246-475-00	CARBON 1.2K 5% 1/4W
R220	1-246-538-00	CARBON 510K 5% 1/4W
R221	1-246-491-00	CARBON 5.6K 5% 1/4W
R222	1-246-457-00	CARBON 220 5% 1/4W
R232	1-246-475-00	CARBON 1.2K 5% 1/4W
R234	1-246-508-00	CARBON 30K 5% 1/4W
R235	1-246-508-00	CARBON 30K 5% 1/4W
R236	1-246-499-00	CARBON 12K 5% 1/4W
R237	1-246-497-00	CARBON 10K 5% 1/4W
R238	1-246-521-00	CARBON 100K 5% 1/4W
R239	1-246-523-00	CARBON 120K 5% 1/4W
R240	1-246-523-00	CARBON 120K 5% 1/4W
R241	1-246-523-00	CARBON 120K 5% 1/4W
R242	1-246-497-00	CARBON 10K 5% 1/4W
R243	1-246-514-00	CARBON 51K 5% 1/4W

Ref. No.	Parts No.	Description
R244	1-246-521-00	CARBON 100K 5% 1/4W
R249	1-246-475-00	CARBON 1.2K 5% 1/4W
R250	1-246-508-00	CARBON 30K 5% 1/4W
R251	1-246-508-00	CARBON 30K 5% 1/4W
R252	1-246-499-00	CARBON 12K 5% 1/4W
R253	1-246-497-00	CARBON 10K 5% 1/4W
R254	1-246-521-00	CARBON 100K 5% 1/4W
R255	1-246-523-00	CARBON 120K 5% 1/4W
R256	1-246-523-00	CARBON 120K 5% 1/4W
R257	1-246-523-00	CARBON 120K 5% 1/4W
R258	1-246-497-00	CARBON 10K 5% 1/4W
R259	1-246-514-00	CARBON 51K 5% 1/4W
R261	1-246-521-00	CARBON 100K 5% 1/4W
R401	1-246-497-00	CARBON 10K 5% 1/4W
R402	1-246-481-00	CARBON 2.2K 5% 1/4W
R403	1-246-447-00	CARBON 82 5% 1/4W
R404	1-246-475-00	CARBON 1.2K 5% 1/4W
R405	1-246-473-00	CARBON 1K 5% 1/4W
R406	1-246-497-00	CARBON 10K 5% 1/4W
R407	1-246-519-00	CARBON 82K 5% 1/4W
R408	1-246-501-00	CARBON 15K 5% 1/4W
R410	1-246-447-00	CARBON 82 5% 1/4W
R411	1-246-475-00	CARBON 1.2K 5% 1/4W
R412	1-246-473-00	CARBON 1K 5% 1/4W
R413	1-246-497-00	CARBON 10K 5% 1/4W
R414	1-246-519-00	CARBON 82K 5% 1/4W
R415	1-246-501-00	CARBON 15K 5% 1/4W
R419	1-246-432-00	CARBON 20 5% 1/4W
R526	1-246-473-00	CARBON 1K 5% 1/4W
R801	1-246-521-00	CARBON 100K 5% 1/4W
R802	1-246-497-00	CARBON 10K 5% 1/4W
R803	1-246-521-00	CARBON 100K 5% 1/4W
R804	1-246-522-00	CARBON 110K 5% 1/4W
R805	1-246-517-00	CARBON 68K 5% 1/4W
R806	1-246-475-00	CARBON 1.2K 5% 1/4W
R807	1-246-497-00	CARBON 10K 5% 1/4W
R808	1-246-521-00	CARBON 100K 5% 1/4W
R809	1-246-497-00	CARBON 10K 5% 1/4W
R810	1-246-521-00	CARBON 100K 5% 1/4W
R811	1-246-537-00	CARBON 470K 5% 1/4W
R812	1-246-521-00	CARBON 100K 5% 1/4W
R813	1-246-483-00	CARBON 2.7K 5% 1/4W
R814	1-246-527-00	CARBON 180K 5% 1/4W
R815	1-246-537-00	CARBON 470K 5% 1/4W
R816	1-246-497-00	CARBON 10K 5% 1/4W

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EQ-4, HP-15

Ref. No.	Parts No.	Description
R817	1-246-523-00	CARBON 120K 5% 1/4W
R818	1-246-507-00	CARBON 27K 5% 1/4W
R819	1-246-493-00	CARBON 6.8K 5% 1/4W
R820	1-246-529-00	CARBON 220K 5% 1/4W
R821	1-246-543-00	CARBON 820K 5% 1/4W
R822	1-246-543-00	CARBON 820K 5% 1/4W
R823	1-246-491-00	CARBON 5.6K 5% 1/4W
R824	1-246-539-00	CARBON 560K 5% 1/4W
R825	1-246-521-00	CARBON 100K 5% 1/4W
R826	1-246-539-00	CARBON 560K 5% 1/4W
R827	1-246-521-00	CARBON 100K 5% 1/4W
R828	1-246-465-00	CARBON 470 5% 1/4W
R829	1-246-510-00	CARBON 36K 5% 1/4W
R830	1-246-521-00	CARBON 100K 5% 1/4W
R831	1-246-473-00	CARBON 1K 5% 1/4W
R832	1-246-473-00	CARBON 1K 5% 1/4W
R833	1-246-521-00	CARBON 100K 5% 1/4W
R834	1-246-506-00	CARBON 24K 5% 1/4W
R835	1-246-517-00	CARBON 68K 5% 1/4W
R836	1-246-521-00	CARBON 100K 5% 1/4W
R837	1-246-505-00	CARBON 22K 5% 1/4W
R838	1-246-497-00	CARBON 10K 5% 1/4W
R840	1-246-543-00	CARBON 820K 5% 1/4W
R841	1-246-545-00	CARBON 1M 5% 1/4W
R842	1-246-491-00	CARBON 5.6K 5% 1/4W
RT401	1-224-251-XX	RES, ADJ, SOLID 4.7K
RT402	1-224-251-XX	RES, ADJ, SOLID 4.7K
RT801	1-224-134-XX	RES, ADJ, SOLID 470K
RT802	1-224-251-XX	RES, ADJ, SOLID 4.7K
RT803	1-224-251-XX	RES, ADJ, SOLID 4.7K
RT804	1-224-251-XX	RES, ADJ, SOLID 4.7K
RV208	1-230-308-00	RES, VAR, CARBON 100K/100K
RV209	1-230-308-00	RES, VAR, CARBON 100K/100K
RV210	1-230-307-00	RES, VAR, CARBON 250K
RV211	1-230-307-00	RES, VAR, CARBON 250K
RV212	1-230-307-00	RES, VAR, CARBON 250K
S206	1-554-687-00	SWITCH, PUSH (4 KEY)
S207	1-554-687-00	SWITCH, PUSH (4 KEY)
S208	1-554-687-00	SWITCH, PUSH (4 KEY)
S209	1-554-687-00	SWITCH, PUSH (4 KEY)

Ref. No.	Parts No.	Description
HP-15 BOARD		
	1-562-269-11	SOCKET, CONNECTOR 3P
	1-562-274-11	TERMINAL, SOLDERLESS
	1-564-227-00	PIN, CONNECTOR 6P
	1-611-443-00	PC BOARD, HP-15
C703	1-102-109-00	CERAMIC 180PF 10% 50V
C704	1-123-356-00	ELECT 10 20% 50V
C705	1-123-307-00	ELECT 100 20% 50V
C708	1-102-109-00	CERAMIC 180PF 10% 50V
C709	1-123-356-00	ELECT 10 20% 50V
C710	1-123-307-00	ELECT 100 20% 10V
C713	1-102-074-00	CERAMIC 0.001 10% 50V
C714	1-102-074-00	CERAMIC 0.001 10% 50V
IC702	8-759-745-56	NJM4556D
J701	1-507-796-21	JACK
R706	1-246-449-00	CARBON 100 5% 1/4W
R708	1-246-509-00	CARBON 33K 5% 1/4W
R709	1-246-517-00	CARBON 68K 5% 1/4W
R710	1-246-479-00	CARBON 1.8K 5% 1/4W
R711	1-246-490-00	CARBON 5.1K 5% 1/4W
R712	1-246-529-00	CARBON 220K 5% 1/4W
R713	1-246-457-00	CARBON 220 5% 1/4W
R714	1-246-449-00	CARBON 100 5% 1/4W
R716	1-246-479-00	CARBON 1.8K 5% 1/4W
R718	1-246-509-00	CARBON 33K 5% 1/4W
R719	1-246-517-00	CARBON 68K 5% 1/4W
R720	1-246-449-00	CARBON 100 5% 1/4W
R721	1-246-490-00	CARBON 5.1K 5% 1/4W
R722	1-246-529-00	CARBON 220K 5% 1/4W
R723	1-246-457-00	CARBON 220 5% 1/4W
R724	1-246-449-00	CARBON 100 5% 1/4W
S701	1-554-686-00	SWITCH, PUSH (2 KEY)

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Ref. No.	Parts No.	Description
LED-7 BOARD		
	1-562-274-00	SOCKET, CONNECTOR 10P
	1-562-276-00	TERMINAL, SOLDERLESS
	1-562-402-11	**SOCKET, CONNECTOR 7P**
	1-564-217-00	PIN, CONNECTOR 3P
	1-611-447-00	PC BOARD, LED-7
D402	**8-719-901-35**	**SLP135B**
D403	**8-719-912-45**	**SLP435B**
D404	**8-719-902-35**	**SLP235B**
D405	**8-719-902-35**	**SLP235B**
D406	**8-719-902-35**	**SLP235B**
D407	**8-719-902-35**	**SLP235B**
D408	**8-719-902-35**	**SLP235B**
D409	**8-719-902-35**	**SLP235B**
D410	**8-719-901-35**	**SLP135B**
D411	**8-719-912-45**	**SLP435B**
D412	**8-719-902-35**	**SLP235B**
D413	**8-719-902-35**	**SLP235B**
D414	**8-719-902-35**	**SLP235B**
D415	**8-719-902-35**	**SLP235B**
D416	**8-719-902-35**	**SLP235B**
D417	**8-719-902-35**	**SLP235B**
D418	**8-719-901-35**	**SLP135B**
D419	**8-719-902-35**	**SLP235B**
MC-21 BOARD		
	A-4364-038-A	COMPLETE PCB, MC-21
	1-564-225-00	PIN, CONNECTOR 4P
	1-564-226-00	PIN, CONNECTOR 5P
	1-564-227-00	PIN, CONNECTOR 6P
	1-564-229-00	PIN, CONNECTOR 10P
	1-564-400-11	PIN, CONNECTOR 2P
	1-564-402-11	PIN, CONNECTOR 2P
C101	**1-123-357-00**	**ELECT 22 20% 50V**
C102	**1-108-565-00**	**MYLAR 0.0027 5% 50V**
C103	**1-123-357-00**	**ELECT 22 20% 50V**
C104	**1-108-565-00**	**MYLAR 0.0027 5% 50V**
C105	**1-108-581-00**	**MYLAR 0.012 5% 50V**
C106	**1-102-106-00**	**CERAMIC 100PF 10% 50V**
C107	**1-102-107-00**	**CERAMIC 120PF 10% 50V**
C108	**1-123-309-00**	**ELECT 330 20% 10V**
C109	**1-123-322-00**	**ELECT 330 20% 16V**
C111	**1-123-322-00**	**ELECT 330 20% 16V**
C112	**1-123-357-00**	**ELECT 22 20% 50V**
C113	**1-108-565-00**	**MYLAR 0.0027 5% 50V**
C114	**1-123-357-00**	**ELECT 22 20% 50V**
C115	**1-108-565-00**	**MYLAR 0.0027 5% 50V**
C116	**1-108-581-00**	**MYLAR 0.012 5% 50V**
C117	**1-102-107-00**	**CERAMIC 120PF 10% 50V**
C118	**1-102-106-00**	**CERAMIC 100PF 10% 50V**
C119	**1-123-309-00**	**ELECT 330 20% 10V**
C120	**1-102-107-00**	**CERAMIC 120PF 10% 50V**
C122	**1-123-357-00**	**ELECT 22 20% 50V**
C123	**1-108-565-00**	**MYLAR 0.0027 5% 50V**
C124	**1-123-357-00**	**ELECT 22 20% 50V**
C125	**1-108-565-00**	**MYLAR 0.0027 5% 50V**
C126	**1-108-581-00**	**MYLAR 0.012 5% 50V**
C127	**1-102-107-00**	**CERAMIC 120PF 10% 50V**
C128	**1-102-106-00**	**CERAMIC 100PF 10% 50V**
C129	**1-123-309-00**	**ELECT 330 20% 10V**
C130	**1-102-107-00**	**CERAMIC 120PF 10% 50V**
C132	**1-123-357-00**	**ELECT 22 20% 50V**
C133	**1-108-565-00**	**MYLAR 0.0027 5% 50V**
C134	**1-123-357-00**	**ELECT 22 20% 50V**
C135	**1-108-565-00**	**MYLAR 0.0027 5% 50V**
C136	**1-108-581-00**	**MYLAR 0.012 5% 50V**
C137	**1-102-107-00**	**CERAMIC 120PF 10% 50V**
C138	**1-102-106-00**	**CERAMIC 100PF 10% 50V**
C139	**1-123-309-00**	**ELECT 330 20% 10V**
C140	**1-102-107-00**	**CERAMIC 120PF 10% 50V**
C142	**1-123-360-00**	**ELECT 100 20% 50V**
C153	**1-123-355-00**	**ELECT 4.7 20% 50V**
C154	**1-123-321-00**	**ELECT 220 20% 16V**
C155	**1-123-308-00**	**ELECT 220 20% 10V**
C156	**1-108-571-00**	**MYLAR 0.0047 5% 50V**
C157	**1-123-321-00**	**ELECT 220 20% 16V**
C158	**1-108-557-00**	**MYLAR 0.0012 5% 50V**
C159	**1-130-622-00**	**FILM 0.015 5% 50V**
C160	**1-123-356-00**	**ELECT 10 20% 50V**
C161	**1-123-355-00**	**ELECT 4.7 20% 50V**
C162	**1-123-308-00**	**ELECT 220 20% 10V**
C163	**1-108-571-00**	**MYLAR 0.0047 5% 50V**
C164	**1-108-557-00**	**MYLAR 0.0012 5% 50V**

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C165	1-130-622-00	FILM 0.015 5% 50V
C166	1-123-356-00	ELECT 10 20% 50V
C167	1-102-107-00	CERAMIC 120PF 10% 50V
C169	1-161-051-00	CERAMIC 0.01 10% 50V
C170	1-108-555-00	MYLAR 0.001 5% 50V
C171	1-108-555-00	MYLAR 0.001 5% 50V
C172	1-108-555-00	MYLAR 0.001 5% 50V
C173	1-108-555-00	MYLAR 0.001 5% 50V
C174	1-108-555-00	MYLAR 0.001 5% 50V
C175	1-108-555-00	MYLAR 0.001 5% 50V
C176	1-108-555-00	MYLAR 0.001 5% 50V
C177	1-108-555-00	MYLAR 0.001 5% 50V
C178	1-102-106-00	CERAMIC 100P 10% 50V
C179	1-102-106-00	CERAMIC 100P 10% 50V
C501	1-123-355-00	ELECT 4.7 20% 50V
C505	1-123-355-00	ELECT 4.7 20% 50V
C528	1-161-051-00	CERAMIC 0.01 10% 50V
C529	1-161-051-00	CERAMIC 0.01 10% 50V
CN105	1-507-927-11	JACK, PIN 8P
CN106	1-507-926-11	JACK, PIN 6P
CN107	1-507-926-11	JACK, PIN 6P
D101	8-719-910-71	HZ7A1L
D102	8-719-910-71	HZ7A1L
D103	8-719-910-71	HZ7A1L
D104	8-719-910-71	HZ7A1L
D105	8-719-910-71	HZ7A1L
D106	8-719-910-71	HZ7A1L
D107	8-719-910-71	HZ7A1L
D108	8-719-910-81	HZ7A1L
D109	8-719-910-81	HZ7A1L
D110	8-719-910-71	HZ7A1L
D111	8-719-910-71	HZ7A1L
D112	8-719-910-71	HZ7A1L
D113	8-719-910-71	HZ7A1L
D114	8-719-910-71	HZ7A1L
D115	8-719-910-71	HZ7A1L
D116	8-719-910-71	HZ7A1L
D517	8-719-815-55	1S1555
D531	8-719-910-25	HZ12B2L
IC101	8-759-745-61	NJM4560D-D
IC102	8-759-745-61	NJM4560D-D
IC103	8-759-745-61	NJM4560D-D

Ref. No.	Parts No.	Description
L101	1-421-649-11	COIL, TROIDAL
L102	1-421-649-11	COIL, TROIDAL
L103	1-421-649-11	COIL, TROIDAL
L104	1-421-649-11	COIL, TROIDAL
Q101	8-765-493-00	2SC2014-3
Q102	8-765-493-00	2SC2014-3
Q103	8-765-493-00	2SC2014-3
Q104	8-765-493-00	2SC2014-3
Q105	8-765-493-00	2SC2014-3
Q106	8-765-493-00	2SC2014-3
Q107	8-765-493-00	2SC2014-3
Q108	8-765-493-00	2SC2014-3
Q501	8-762-020-00	2SA835
R101	1-214-749-00	METAL 6.8K 1% 1/4W
R102	1-214-749-00	METAL 6.8K 1% 1/4W
R103	1-246-445-00	CARBON 68 5% 1/4W
R104	1-246-497-00	CARBON 10K 5% 1/4W
R105	1-246-445-00	CARBON 68 5% 1/4W
R106	1-246-521-00	CARBON 100K 5% 1/4W
R107	1-246-521-00	CARBON 100K 5% 1/4W
R108	1-214-753-00	METAL 10K 1% 1/4W
R109	1-214-753-00	METAL 10K 1% 1/4W
R110	1-246-449-00	CARBON 100 5% 1/4W
R110	1-246-449-00	CARBON 100 5% 1/4W
R111	1-246-471-00	CARBON 820 5% 1/4W
R112	1-214-757-00	METAL 15K 1% 1/4W
R113	1-214-757-00	METAL 15K 1% 1/4W
R114	1-214-777-00	METAL 100K 1% 1/4W
⚠R115	1-212-873-51	FUSIBLE 47 5% 1/4W
R116	1-214-777-00	METAL 100K 1% 1/4W
R117	1-214-749-00	METAL 6.8K 1% 1/4W
R118	1-214-749-00	METAL 6.8K 1% 1/4W
R119	1-246-445-00	CARBON 68 5% 1/4W
R120	1-246-497-00	CARBON 10K 5% 1/4W
R121	1-246-445-00	CARBON 68 5% 1/4W
R122	1-246-521-00	CARBON 100K 5% 1/4W
R123	1-246-521-00	CARBON 100K 5% 1/4W
R124	1-214-777-00	METAL 100K 1% 1/4W
R125	1-214-753-00	METAL 10K 1% 1/4W
R126	1-214-753-00	METAL 10K 1% 1/4W
R127	1-246-449-00	CARBON 100 5% 1/4W
R128	1-246-471-00	CARBON 820 5% 1/4W
R129	1-214-757-00	METAL 15K 1% 1/4W

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Ref. No.	Parts No.	Description
R130	1-214-757-00	METAL 15K 1% 1/4W
R131	1-214-777-00	METAL 100K 1% 1/4W
R132	1-214-749-00	METAL 6.8K 1% 1/4W
R133	1-214-749-00	METAL 6.8K 1% 1/4W
R134	1-246-445-00	CARBON 68 5% 1/4W
R135	1-246-497-00	CARBON 10K 5% 1/4W
R136	1-246-445-00	CARBON 68 5% 1/4W
R137	1-246-521-00	CARBON 100K 5% 1/4W
R138	1-246-521-00	CARBON 100K 5% 1/4W
R139	1-214-777-00	METAL 100K 1% 1/4W
R140	1-214-753-00	METAL 10K 1% 1/4W
R141	1-214-753-00	METAL 10K 1% 1/4W
R142	1-246-449-00	CARBON 100 5% 1/4W
R143	1-246-471-00	CARBON 820 5% 1/4W
R144	1-214-757-00	METAL 15K 1% 1/4W
R145	1-214-757-00	METAL 15K 1% 1/4W
R146	1-214-777-00	METAL 100K 1% 1/4W
R147	1-214-749-00	METAL 6.8K 1% 1/4W
R148	1-214-749-00	METAL 6.8K 1% 1/4W
R149	1-246-445-00	CARBON 68 5% 1/4W
R150	1-246-497-00	CARBON 10K 5% 1/4W
R151	1-246-445-00	CARBON 68 5% 1/4W
R152	1-246-521-00	CARBON 100K 5% 1/4W
R153	1-246-521-00	CARBON 100K 5% 1/4W
R154	1-214-777-00	METAL 100K 1% 1/4W
R155	1-214-753-00	METAL 10K 1% 1/4W
R156	1-214-753-00	METAL 10K 1% 1/4W
R157	1-246-449-00	CARBON 100 5% 1/4W
R158	1-246-471-00	CARBON 820 5% 1/4W
R159	1-214-757-00	METAL 15K 1% 1/4W
R160	1-214-757-00	METAL 15K 1% 1/4W
R161	1-214-777-00	METAL 100K 1% 1/4W
R170	1-246-521-00	CARBON 100K 5% 1/4W
R171	1-246-521-00	CARBON 100K 5% 1/4W
R172	1-246-466-00	CARBON 510 5% 1/4W
R173	1-246-457-00	CARBON 220 5% 1/4W
R174	1-214-758-51	METAL 16K 1% 1/4W
⚠R175	1-212-881-51	FUSIBLE 100 5% 1/4W
R176	1-214-784-00	METAL 200K 1% 1/4W
⚠R177	1-212-881-51	FUSIBLE 100 5% 1/4W
R178	1-246-521-00	CARBON 100K 5% 1/4W
R179	1-246-521-00	CARBON 100K 5% 1/4W
R180	1-246-466-00	CARBON 510 5% 1/4W
R181	1-246-457-00	CARBON 220 5% 1/4W
R182	1-214-758-51	METAL 16K 1% 1/4W

Ref. No.	Parts No.	Description
R183	1-214-784-00	METAL 200K 1% 1/4W
⚠R184	1-212-873-51	FUSIBLE 47 5% 1/4W
R203	1-246-517-00	CARBON 68K 5% 1/4W
R211	1-246-517-00	CARBON 68K 5% 1/4W
R224	1-246-517-00	CARBON 68K 5% 1/4W
R226	1-246-517-00	CARBON 68K 5% 1/4W
R277	1-246-521-00	CARBON 100K 5% 1/4W
R278	1-246-449-00	CARBON 100 5% 1/4W
R282	1-246-521-00	CARBON 100K 5% 1/4W
R283	1-246-449-00	CARBON 100 5% 1/4W
R288	1-246-473-00	CARBON 1K 5% 1/4W
R289	1-246-473-00	CARBON 1K 5% 1/4W
R292	1-246-517-00	CARBON 68K 5% 1/4W
R501	1-246-459-00	CARBON 270 5% 1/4W
R502	1-246-511-00	CARBON 39K 5% 1/4W
R507	1-246-513-00	CARBON 47K 5% 1/4W
R508	1-246-491-00	CARBON 5.6K 5% 1/4W
S201	1-516-777-11	SLIDE SWITCH
S202	1-516-777-11	SLIDE SWITCH
S203	1-516-777-11	SLIDE SWITCH
S204	1-516-777-11	SLIDE SWITCH
S210	1-516-777-11	SLIDE SWITCH
S211	1-516-785-12	SWITCH, SLIDE

PA-32 BOARD

A-4388-368-A	COMPLETE PCB, PA-32
1-508-810-00	14MM BASE POST
1-560-061-00	PIN, CONNECTOR 3P
1-564-104-00	PIN, CONNECTOR 3P
1-564-224-00	PIN, CONNECTOR 3P
1-564-225-00	PIN, CONNECTOR 4P
1-564-242-00	PIN, CONNECTOR 5P
3-312-615-11	HEAT SINK

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Ref. No.	Parts No.	Description
C301	1-123-309-00	ELECT 330 20% 10V
C302	1-123-380-00	ELECT 1 20% 50V
C303	1-123-356-00	ELECT 10 20% 50V
C304	1-123-307-00	ELECT 100 20% 10V
C305	1-123-298-00	ELECT 470 20% 6.3V
C306	1-123-298-00	ELECT 470 20% 6.3V
C307	1-123-298-00	ELECT 470 20% 6.3V
C308	1-123-310-00	ELECT 470 20% 10V
C309	1-123-310-00	ELECT 470 20% 10V
C310	1-123-310-00	ELECT 470 20% 10V
C504	1-123-385-00	ELECT 22 20% 100V
C510	1-123-334-00	ELECT 220 20% 25V
C511	1-123-321-00	ELECT 220 20% 16V
C512	1-123-321-00	ELECT 220 20% 16V
C513	1-123-321-00	ELECT 220 20% 16V
C514	1-123-321-00	ELECT 220 20% 16V
C517	1-123-361-00	ELECT 220 20% 50V
C518	1-123-448-00	ELECT (BLOCK) 6800 50V
C519	1-123-356-00	ELECT 10 20% 50V
C520	1-123-361-00	ELECT 220 20% 50V
C530	1-123-448-00	ELECT (BLOCK) 6800 50V
C601	1-123-309-00	ELECT 330 20% 10V
C602	1-123-380-00	ELECT 1 20% 50V
C603	1-123-356-00	ELECT 10 20% 50V
C604	1-123-307-00	ELECT 100 20% 10V
C605	1-123-298-00	ELECT 470 20% 6.3V
C606	1-123-298-00	ELECT 470 20% 6.3V
C607	1-123-298-00	ELECT 470 20% 6.3V
C608	1-123-310-00	ELECT 470 20% 10V
C609	1-123-310-00	ELECT 470 20% 10V
C610	1-123-310-00	ELECT 470 20% 10V
D301	8-719-300-16	SV-03S
D302	8-719-300-16	SV-03S
D303	8-719-995-61	HZ6C1
D304	8-719-815-55	1S1555
D305	8-719-815-55	1S1555
D306	8-719-815-55	1S1555
D307	8-729-910-61	HZ6A1L
D308	8-729-910-61	HZ6A1L
D309	8-719-815-55	1S1555

Ref. No.	Parts No.	Description
D503	8-719-505-10	S5VB10
D504	8-719-200-02	10E-2
D511	8-719-815-55	1S1555
D512	8-719-907-21	HZ12C1
D513	8-719-815-55	1S1555
D514	8-719-907-21	HZ12C1
D601	8-719-300-16	SV-03S
D602	8-719-300-16	SV-03S
D603	8-719-995-61	HZ6C1
D604	8-719-815-55	1S1555
D605	8-719-815-55	1S1555
D606	8-719-815-55	1S1555
D607	8-729-910-61	HZ6A1L
D608	8-729-910-61	HZ6A1L
D609	8-719-815-55	1S1555
D610	8-719-815-55	1S1555
D611	8-719-815-55	1S1555
IC301	8-759-320-02	HA12002
IC601	8-759-320-02	HA12002
L301	1-408-251-00	3.3mmH
L302	1-420-838-00	COIL
L601	1-408-251-00	3.3mmH
L602	1-420-838-00	COIL
Q301	8-729-307-58	2SC1775A
Q302	8-729-307-58	2SC1775A
Q303	8-729-300-62	2SD666A-C
Q304	8-729-114-22	2SA1142-Q
Q305	8-729-107-53	2SC2275A-P
Q306	8-729-107-53	2SC2275A-P
Q307	8-729-190-53	2SA985A-P
Q310	8-729-602-77	2SA1027-7
Q311	8-729-602-77	2SA1027-7
Q312	8-729-602-77	2SA1027-7
Q313	8-729-602-77	2SA1027-7
Q314	8-729-602-77	2SA1027-7
Q315	8-729-281-53	2SC1815-GR
Q316	8-729-281-53	2SC1815-GR
Q317	8-729-281-53	2SC1815-GR

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Ref. No.	Parts No.	Description
Q318	8-729-281-53	2SC1815-GR
Q319	8-729-281-53	2SC1815-GR
Q401	8-729-334-58	2SC1345-E
Q504	8-729-107-53	2SC2275A-P
Q505	8-729-334-58	2SC1345-E
Q506	8-729-334-58	2SC1345-E
Q507	8-729-334-58	2SC1345-E
Q508	8-729-168-22	2SC2682Q
Q509	8-729-377-12	2SA771
Q514	8-729-334-58	2SC1345-E
Q601	8-729-307-58	2SC1775A
Q602	8-729-307-58	2SC1775A
Q603	8-729-300-62	2SD666A-C
Q604	8-729-114-22	2SA1142-Q
Q605	8-729-107-53	2SC2275A-P
Q606	8-729-107-53	2SC2275A-P
Q607	8-729-190-53	2SA985A-P
Q610	8-729-602-77	2SA1027-7
Q611	8-729-602-77	2SA1027-7
Q612	8-729-602-77	2SA1027-7
Q613	8-729-602-77	2SA1027-7
Q614	8-729-602-77	2SA1027-7
Q615	8-729-281-53	2SC1815-GR
Q616	8-729-281-53	2SC1815-GR
Q617	8-729-281-53	2SC1815-GR
Q618	8-729-281-53	2SC1815-GR
Q619	8-729-281-53	2SC1815-GR
R301	1-800-427-00	POSISTOR
R302	1-246-523-00	CARBON 120K 5% 1/4W
R303	1-246-481-00	CARBON 2.2K 5% 1/4W
R304	1-246-511-00	CARBON 39K 5% 1/4W
R305	1-246-481-00	CARBON 2.2K 5% 1/4W
R306	1-246-481-00	CARBON 2.2K 5% 1/4W
R307	1-246-507-00	CARBON 27K 5% 1/4W
R308	1-246-441-00	CARBON 47 5% 1/4W
R309	1-246-489-00	CARBON 4.7K 5% 1/4W
R310	1-246-489-00	CARBON 4.7K 5% 1/4W
R311	1-246-441-00	CARBON 47 5% 1/4W
R312	1-246-517-00	CARBON 68K 5% 1/4W
R313	1-246-441-00	CARBON 47 5% 1/4W
R314	1-246-499-00	CARBON 12K 5% 1/4W
R315	1-246-468-00	CARBON 620 5% 1/4W
⚠R316	1-247-119-00	CARBON 330 5% 1/4W (NONFLAMMABLE)
R317	1-246-513-00	CARBON 47K 5% 1/4W
R318	1-246-488-00	CARBON 4.3K 5% 1/4W
R319	1-246-507-00	CARBON 27K 5% 1/4W

Ref. No.	Parts No.	Description
R320	1-246-517-00	CARBON 68K 5% 1/4W
R321	1-246-465-00	CARBON 470 5% 1/4W
R322	1-246-473-00	CARBON 1K 5% 1/4W
R323	1-246-501-00	CARBON 15K 5% 1/4W
⚠R324	1-247-119-00	CARBON 330 5% 1/4W (NONFLAMMABLE)
R325	1-246-467-00	CARBON 560 5% 1/4W
R326	1-246-477-00	CARBON 1.5K 5% 1/4W
⚠R327	1-247-124-00	CARBON 510 5% 1/4W (NONFLAMMABLE)
⚠R328	1-212-883-51	FUSIBLE 120 5% 1/4W
⚠R329	1-247-079-00	CARBON 4.7 5% 1/4W (NONFLAMMABLE)
⚠R330	1-247-079-00	CARBON 4.7 5% 1/4W (NONFLAMMABLE)
R331	1-214-754-00	METAL 11K 1% 1/4W
R332	1-217-156-00	RES, METAL PLATE 0.22
R333	1-217-156-00	RES, METAL PLATE 0.22
R334	1-246-497-00	CARBON 10K 5% 1/4W
R335	1-246-514-00	CARBON 51K 5% 1/4W
R336	1-246-486-00	CARBON 3.6K 5% 1/4W
R337	1-246-486-00	CARBON 3.6K 5% 1/4W
R338	1-246-484-00	CARBON 3K 5% 1/4W
R339	1-246-484-00	CARBON 3K 5% 1/4W
R340	1-246-481-00	CARBON 2.2K 5% 1/4W
R341	1-246-512-00	CARBON 43K 5% 1/4W
R342	1-246-545-00	CARBON 1M 5% 1/4W
R343	1-246-545-00	CARBON 1M 5% 1/4W
R344	1-246-514-00	CARBON 51K 5% 1/4W
R345	1-246-497-00	CARBON 10K 5% 1/4W
R346	1-246-484-00	CARBON 3K 5% 1/4W
R347	1-246-484-00	CARBON 3K 5% 1/4W
R348	1-246-486-00	CARBON 3.6K 5% 1/4W
R349	1-246-486-00	CARBON 3.6K 5% 1/4W
R350	1-246-481-00	CARBON 2.2K 5% 1/4W
R351	1-246-512-00	CARBON 43K 5% 1/4W
R352	1-246-545-00	CARBON 1M 5% 1/4W
R353	1-246-545-00	CARBON 1M 5% 1/4W
R355	1-246-488-00	CARBON 4.3K 5% 1/4W

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Ref. No.	Parts No.	Description
R356	1-246-507-00	CARBON 27K 5% 1/4W
R357	1-264-503-00	CARBON 18K 5% 1/4W
⚠R358	1-247-239-00	CARBON 910 5% 1/2W (NONFLAMMABLE)
⚠R361	1-217-570-00	RES, METAL PLATE 2.2
R409	1-246-524-00	CARBON 130K 5% 1/4W
R416	1-246-521-00	CARBON 100K 5% 1/4W
R417	1-246-485-00	CARBON 3.3K 5% 1/4W
R418	1-246-524-00	CARBON 130K 5% 1/4W
⚠R506	1-212-881-51	FUSIBLE 100 5% 1/4W
R523	1-246-505-00	CARBON 22K 5% 1/4W
R524	1-246-497-00	CARBON 10K 5% 1/4W
R525	1-246-480-00	CARBON 2K 5% 1/4W
R527	1-246-501-00	CARBON 15K 5% 1/4W
R528	1-246-493-00	CARBON 6.8K 5% 1/4W
⚠R529	1-247-260-00	CARBON 6.8K 5% 1/2W (NONFLAMMABLE)
R530	1-246-476-00	CARBON 1.3K 5% 1/4W
R531	1-246-513-00	CARBON 47K 5% 1/4W
R532	1-246-513-00	CARBON 47K 5% 1/4W
R533	1-246-485-00	CARBON 3.3K 5% 1/4W
R534	1-246-485-00	CARBON 3.3K 5% 1/4W
R537	1-246-475-00	CARBON 1.2K 5% 1/4W
R539	1-247-180-11	CARBON 1 5% 1/2W (NONFLAMMABLE)
R601	1-800-427-00	POSISTOR
R602	1-246-523-00	CARBON 120K 5% 1/4W
R603	1-246-481-00	CARBON 2.2K 5% 1/4W
R604	1-246-511-00	CARBON 39K 5% 1/4W
R605	1-246-481-00	CARBON 2.2K 5% 1/4W
R606	1-246-481-00	CARBON 2.2K 5% 1/4W
R607	1-246-507-00	CARBON 27K 5% 1/4W
R608	1-246-441-00	CARBON 47 5% 1/4W
R609	1-246-489-00	CARBON 4.7K 5% 1/4W
R610	1-246-489-00	CARBON 4.7K 5% 1/4W
R611	1-246-441-00	CARBON 47 5% 1/4W
R612	1-246-517-00	CARBON 68K 5% 1/4W
R613	1-246-441-00	CARBON 47 5% 1/4W
R614	1-246-499-00	CARBON 12K 5% 1/4W
R615	1-246-468-00	CARBON 620 5% 1/4W
⚠R616	1-247-119-00	CARBON 330 5% 1/4W (NONFLAMMABLE)
R617	1-246-513-00	CARBON 47K 5% 1/4W

Ref. No.	Parts No.	Description
R618	1-246-488-00	CARBON 4.3K 5% 1/4W
R619	1-246-507-00	CARBON 27K 5% 1/4W
R620	1-246-517-00	CARBON 68K 5% 1/4W
R621	1-246-465-00	CARBON 470 5% 1/4W
R622	1-246-473-00	CARBON 1K 5% 1/4W
R623	1-246-501-00	CARBON 15K 5% 1/4W
⚠R624	1-247-119-00	CARBON 330 5% 1/4W (NONFLAMMABLE)
R625	1-246-467-00	CARBON 560 5% 1/4W
R626	1-246-477-00	CARBON 1.5K 5% 1/4W
⚠R627	1-247-124-00	CARBON 510 5% 1/4W (NONFLAMMABLE)
⚠R628	1-212-883-51	FUSIBLE 120 5% 1/4W (NONFLAMMABLE)
⚠R629	1-247-079-00	CARBON 4.7 5% 1/4W (NONFLAMMABLE)
⚠R630	1-247-079-00	CARBON 4.7 5% 1/4W (NONFLAMMABLE)
R631	1-214-754-00	METAL 11K 1% 1/4W
R632	1-217-156-00	RES, METAL PLATE 0.22
R633	1-217-156-00	RES, METAL PLATE 0.22
R634	1-246-497-00	CARBON 10K 5% 1/4W
R635	1-246-514-00	CARBON 51K 5% 1/4W
R636	1-246-486-00	CARBON 3.6K 5% 1/4W
R637	1-246-486-00	CARBON 3.6K 5% 1/4W
R638	1-246-484-00	CARBON 3K 5% 1/4W
R639	1-246-484-00	CARBON 3K 5% 1/4W
R640	1-246-481-00	CARBON 2.2K 5% 1/4W
R641	1-246-512-00	CARBON 43K 5% 1/4W
R642	1-246-545-00	CARBON 1M 5% 1/4W
R643	1-246-545-00	CARBON 1M 5% 1/4W
R644	1-246-514-00	CARBON 51K 5% 1/4W
R645	1-246-497-00	CARBON 10K 5% 1/4W
R646	1-246-484-00	CARBON 3K 5% 1/4W
R647	1-246-484-00	CARBON 3K 5% 1/4W
R648	1-246-486-00	CARBON 3.6K 5% 1/4W
R649	1-246-486-00	CARBON 3.6K 5% 1/4W
R650	1-246-481-00	CARBON 2.2K 5% 1/4W
R651	1-246-512-00	CARBON 43K 5% 1/4W
R652	1-246-545-00	CARBON 1M 5% 1/4W

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Ref. No.	Parts No.	Description
R653	**1-246-545-00**	**CARBON 1M 5% 1/4W**
R655	**1-246-488-00**	**CARBON 4.3K 5% 1/4W**
R656	**1-246-507-00**	**CARBON 27K 5% 1/4W**
R657	**1-246-503-00**	**CARBON 18K 5% 1/4W**
⚠**R658**	**1-247-239-00**	**CARBON 910 5% 1/2W (NONFLAMMABLE)**
⚠**R661**	**1-217-570-00**	**RES, METAL PLATE 2.2**
RT301	**1-224-249-XX**	**RES, ADJ, SOLID 1K**
RT302	**1-224-249-XX**	**RES, ADJ, SOLID 1K**
RT601	**1-224-249-XX**	**RES, ADJ, SOLID 1K**
RT602	**1-224-249-XX**	**RES, ADJ, SOLID 1K**
RY301	**1-515-278-00**	**RELAY**
RY601	**1-515-278-00**	**RELAY**
RY602	**1-515-510-00**	**RELAY**

PS-49 BOARD

	1-508-809-00	BASE POST (14MM) 2P
	1-517-072-00	LAMP HOLDER (AE)
⚠	**1-532-724-11**	**FUSE, TEMPERATURE**
	1-533-131-00	**HOLDER, FUSE**
	1-535-136-00	BASE POST 14MM (10MM PITCH) 3P
	1-535-137-00	BASE POST 14MM (10MM PITCH)
	1-564-224-00	PIN, CONNECTOR 3P
	1-564-225-00	PIN, CONNECTOR 4P
	1-564-226-00	PIN, CONNECTOR 5P
	1-564-242-00	PIN, CONNECTOR 5P
	1-564-400-11	PIN, CONNECTOR 2P
	1-611-444-00	PC BOARD, PS-49
	4-854-790-11	HEAT SINK

Ref. No.	Parts No.	Description
C515	**1-123-324-00**	**ELECT 1000 20% 16V**
C516	**1-123-324-00**	**ELECT 1000 20% 16V**
C521	**1-123-337-00**	**ELECT 1000 20% 25V**
C522	**1-123-336-00**	**ELECT 470 20% 16V**
C523	**1-123-336-00**	**ELECT 470 20% 16V**
C524	**1-123-337-00**	**ELECT 1000 20% 25V**
⚠**C526**	**1-161-742-00**	**CERAMIC 0.0022 20% 400V**
⚠**C527**	**1-161-742-00**	**CERAMIC 0.0022 20% 400V**
C531	**1-123-333-00**	**ELECT 100 20% 25V**
C532	**1-123-308-00**	**ELECT 220 20% 10V**
D501	**8-719-200-02**	**10E-2**
D502	**8-719-200-02**	**10E-2**
D505	**8-719-200-02**	**10E-2**
D506	**8-719-200-02**	**10E-2**
D507	**8-719-200-02**	**10E-2**
D508	**8-719-200-02**	**10E-2**
D509	**8-719-200-02**	**10E-2**
D510	**8-719-200-02**	**10E-2**
D515	**8-719-901-61**	**HZ16-1L**
D516	**8-719-901-61**	**HZ16-1L**
D528	**8-719-200-02**	**10E-2**
D529	**8-719-815-55**	**1S1555**
D530	**8-719-815-55**	**1S1555**
Q510	**8-729-217-33**	**2SC1173-Y**
Q511	**8-729-334-58**	**2SC1345E**
Q512	**8-729-602-77**	**2SA1027-7**
Q513	**8-729-247-33**	**2SA473-Y**
Q514	**8-729-334-58**	**2SC1345E**
R535	**1-246-473-00**	**CARBON 1K 5% 1/4W**
R536	**1-246-473-00**	**CARBON 1K 5% 1/4W**
R538	**1-246-481-00**	**CARBON 2.2K 5% 1/4W**
R544	**1-246-441-00**	**CARBON 47 5% 1/4W**
⚠**R545**	**1-247-214-00**	**CARBON 82 5% 1/2W (NONFLAMMABLE)**

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PS-49, VR-19, FRAME

Ref. No.	Parts No.	Description
R546	1-246-497-00	CARBON 10K 5% 1/4W
R547	1-246-513-00	CARBON 47K 5% 1/4W
⚠RY501	1-515-367-00	RELAY

VR-19 BOARD

	1-611-445-00	PC BOARD, VR-19
RV701	1-230-310-00	RES, VAR, CARBON 50K/50K

Ref. No.	Parts No.	Description
FRAME		
	1-102-106-00	CAP, CERAMIC 100PF
⚠	1-447-751-11	TRANSFORMER, POWER (AE)
⚠	1-447-752-11	TRANSFORMER, POWER (J, U, CA)
	1-509-184-00	CONNECTOR (RECEPTACLE) 3P (CA)
⚠	1-509-547-00	3P INLET
⚠	1-526-572-00	SOCKET, POWER VOLTAGE SELECT (AE)
⚠	1-526-695-00	OUTLET, AC (2 GANG) (J)
⚠	1-532-430-00	FUSE, GLASS TUBE 0.5A (J)
⚠	1-532-580-00	FUSE, GLASS TUBE 0.5A (U, CA)
⚠	1-532-704-00	FUSE 5A (J, U, CA)
⚠	1-532-717-00	FUSE, GLASS TUBE 10A (J)
⚠	1-532-719-00	FUSE, GLASS TUBE 8A (U, CA)
	1-536-767-00	TERMINAL BOARD, SPEAKER
⚠	1-554-709-11	SWITCH, SEESAW (AC POWER)
	1-562-299-00	CONNECTOR (RECEPTACLE) (J, U, AE)
	1-562-395-00	CONNECTOR (RECEPTACLE)
	1-562-286-00	HOUSING, CONNECTOR 5P

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Ref. No.	Parts No.	Description
ECP-5-3PHS (MIC CABLE)		
	1-508-084-11	**PLUG CONNECTOR**
	1-508-199-11	**SOCKET**
	1-534-161-00	**MIC CABLE**
W/D MIC BOARD		
	1-600-858-00	PC BOARD, W/D MIC
C1	**1-131-375-00**	**TANTALUM 4.7 20% 10V**
C2	**1-108-583-00**	**MYLAR 0.015 5% 50V**
C3	**1-131-381-00**	**TANTALUM 47 20% 10V**
C4	**1-131-381-00**	**TANTALUM 47 20% 10V**
C5	**1-131-381-00**	**TANTALUM 47 20% 10V**
C6	**1-131-381-00**	**TANTALUM 47 20% 10V**
D1	**8-719-122-00**	**VD1220**
L1	**1-459-280-00**	**COIL, SWITCHING**
Q1	**8-729-671-14**	**2SC710-14**
R1	**1-247-883-00**	**CARBON 150K 5% 1/6W**
R2	**1-247-855-00**	**CARBON 10K 5% 1/6W**
R3	**1-247-827-00**	**CARBON 680 5% 1/6W**
R4	**1-247-883-00**	**CARBON 150K 5% 1/6W**
R5	**1-247-883-00**	**CARBON 150K 5% 1/6W**

5-4. PACKING MATERIAL AND ACCESSORY

Ref. No.	Parts No.	Description
ACCESSORY AND PACKING GROUP		
	⚠ 1-551-812-00	**CORD, POWER (U, CA)**
	⚠ 1-556-760-00	**CORD, POWER (3 CORD) (AE)**
	⚠ 1-557-161-00	**CORD, POWER (J)**
	1-562-394-11	**PLUG, CONNECTOR**
	1-564-389-11	**PLUG, CONNECTOR**
	3-701-630-00	**BAG, POLYETHYLENE**
	3-701-640-00	**BAG, POLYETHYLENE**
	3-773-750-01	**MANUAL, INSTRUCTION (J)**
	3-773-750-11	**MANUAL, INSTRUCTION (U, CA, AE)**
	4-902-701-00	INDIVIDUAL CARTON
	4-902-702-00	SPACER
	4-902-703-00	CUSHION (FRONT), UPPER
	4-902-704-00	CUSHION (REAR), UPPER
	4-902-705-00	CUSHION (FRONT), LOWER
	4-902-706-00	CUSHION (REAR), LOWER

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